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DANIEL H. BURNHAM—PLANNER OF CITIES*

BY IRVING K. POND, F. A. I. A.

CHARLES MOORE'S tribute to Daniel H. Burnham, Architect and Planner of Cities, cast in the mould of two sumptuous volumes lies before me. The work is a pleasure to the eye in its general form, typography and illustrations; it is pleasing to the mind in its bigness and simple directness. In literary style the work lacks a certain sparkle; but, quite in character with the central figure, there pounds throughout the insistent pulsing of a real force with its rhythm broken now and again by abrupt transitions. Charles Moore comes, in many particulars, more than ordinarily well qualified, to his task, the which, if I read correctly between the lines, was undertaken in a spirit of sincere admiration for his subject. Mr. Moore has had sufficient opportunity to study the Man Burnham at short and at long range over a considerable period of time embracing all those years in which Mr. Burnham was in the public eye. His writing shows in what exalted esteem Mr. Moore held the man. Mr. Moore's participation in the art life of the nation, let me say, rather, in art activities as touching the nation,—for the nation as such has no art life—no art instinct—no art inclination, nor soon is likely to have,—Mr. Moore's participation, then, budded while he was still Secretary to Senator James McMillan in 1889, and flowered with his appointment to the original National Commission of Fine Arts in 1910, when Mr. Burnham was made chairman. His fruit fortunately is still in the gathering.

It was the Chicago Fair, The World's Columbian Exposition, as it was called, that focused the public eye upon Mr. Burnham. His firm, Burnham and Root, at that time was favorably known from coast to coast for the quality as well as the quantity of its output. The designing had fallen to Root, an artistic genius rather, perhaps, than a finished artist, while to Burnham had fallen the task of administration. Root had an eclectic mind and sought various forms and manners of expression. He essayed the Romanesque and did it well. He did not continue in it as it lacked the freedom of movement in mass and line and the sparkle of light and shade which so appealed to him. He tried original forms always based more or less upon the Gothic, but mostly he used forms akin to the Flemish though never servilely but freely, spontaneously and daintily, after his own true nature. It is interesting, though perhaps idle, to conjecture what might have been the artistic development of the work of Burnham and Root had John Root lived to direct the design of the Fair. In her "romantic study of the life of John Wellborn Root," as Mr. Moore lightly characterizes Harriet Monroe's important and well considered work (p.44 foot note) Miss Monroe includes a document, said still to exist in John Root's handwriting, which is essentially the same as the "memorial" said by Mr. Moore (p.37) to have been drawn up by Burnham and presented by him to his confreres for their signatures. In these documents the fourth of the possible lines of procedure suggested was to summon architects from the outside to assist in the design of the Fair (p.39). This suggestion I am quite convinced emanated from Root, who, upon the adoption of the scheme, went East to enlist the sympathies of the selected architects in the affair. Mr. Moore makes slight mention of Root's participation in these preliminaries, making Burnham the principal factor. In the light of my recollection of the gossip of the day, I am inclined to agree with Miss Monroe. But there was honor enough for all in the management and outcome of the Fair and Burnham reaped his full share.

In this work at the Fair Burnham developed that capacity for handling men, and for attaching men to him in bonds of friendship and even of devotion, which marked so strongly his further professional experience. He was an autocrat at the time and necessarily so, and this rankled in the bosoms of some of his co-workers; but the cloud was dispelled before the echoes of the Fair had materially died away. Friendships made at that time (I am drawing on Mr. Moore for the sentiment I am now expressing) were sundered only by

*Daniel H. Burnham, Architect, Planner of Cities, by Charles Moore. With illustrations. Two Volumes. Boston and New York. Houghton, Mifflin Company, MCMXXI.

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the death first of others, then of Burnham himself. McKim, Peabody, Hunt, St. Gaudens, the older Olmstead, Theodore Thomas, Frank Millet were a few of those who had passed over before Burnham was called. Their words and deeds shine through the pages of Moore's work. The correspondence between Burnham and McKim was voluminous and is interestingly set forth, correspondence touching many subjects and phases from the trials of Commission activities in connection with Washington Plan and Lincoln Monument controversies to the style to be employed in the Washington Cathedral.

Whatever may have been Burnham's stylistic leanings before the Fair, certain it is that ever thereafter he was a convinced if not convincing classicist; and, reading between the lines of Moore's record of their friendship, probably due, (that is, the "convinced" part of it,) mostly to the influence of McKim. In the matter of West Point, Burnham proposed the adoption of a classic style for this military college—the style of peace, poise and repose. Evidently, in the matter of the Washington Cathedral, Burnham, due to a certain inhering religious mysticism, inclined at first to a Gothic expression, but McKim convinced him that there had been no good Gothic for several centuries (and, therefore, could be none now!). Burnham puts this in a letter to Bishop Satterlee, (II p.56 seq)—a most naive document, suggesting that one of his own talented assistants be employed to design a Classic-renaissance Cathedral, and disposing of Bodley and the Gothic thus: "Doing small gems is no proof that the same man could handle monumental work, but, on the contrary, experience has shown that the sort of architect who does the gems never succeeds in large things." Bacon and the Lincoln Monument were to come later before Mr. Burnham's mind's eye!

The entire correspondence makes excellent reading; but, after a careful perusal, including Burnham's letter of November 28, 1906, (II p.60) to the good Bishop, I cannot quite bring myself to feel that any keen sense of humor lay behind the countenance that Zorn painted. (See frontispiece to Vol. I.)

In point of fact all this correspondence seems to indicate that neither Burnham nor McKim had ever philosophically thought through the the matter of an appropriate national expression, either civic or ecclesiastical. Each was following his own temperamental line of least resistance; Burnham in the big theatricalism impressed upon him by the Fair; McKim in the refinement of mass and line which he applied at the Fair as elsewhere. (See Charles Eliot Norton's Estimate of the Fair, p.87 seq.) And speaking of classic, Mr. Moore does scant justice to Chicago's Fair-time City Hall. (p.29.) It did "belong to the classical category." It had no sign of a "mansard roof" and its one order, not at all "puny," and "superimposed" only upon a pedestaled basement, and embracing two full high stories, was crowned with an enriched attic. I have, within a few days now, heard architects of high standing remark upon the noble mass and interesting outline of that particular building. Indeed, it seems completely to have embodied Burnham's theory of design as set forth in his aphorisms* (see that on scale, II pp.168-9). In so far as mere scale is concerned, its successor was no improvement upon it, and in true classical content it was not behind certain commercial structures designed by Burnham and Co.; say one erected in 1910 (II p.212). Referring again to the "aphorisms"; I am inclined to surmise that had I been selecting Mr. Moore's material, I would have omitted that particular one near the top of page 168 and especially the concluding remark: "Then he chuckled and looked wise like an owl." It brings involuntarily to mind Carlyle's characterization of Daniel Webster as "the damnedest deception of the century." "How so?" asked a friend. "Because," replied Carlyle, "God Almighty never made a man half so wise as he looks." I am half inclined to think that the introduction of this aphorism was one of Willis's sly little Polks.

But to return to Moore and his subject. Daniel H. Burnham was a man of great force and broad vision, and sufficiently wise in his generation. He did leave an impress on city planning, and showed his wisdom in urging in all things idealism and breadth of conception. "Never think things in a small way," he might have said; and "do in a big way the little things that one must perforce do" he might have added; the idea might have modified some of his correspondence with Bishop Satterlee. Burnham's scheme for the improvement of Chicago was grand, was magnificent. The Lake Front project was not his originally but he treated it magnificently with breadth of feeling and with beauty. As to the virtue of his conception of the great city lying back of the Lake Front, especially as presented in the wonderful drawings of Guérin and others, there is some question. There are those who believe that the ideal Chicago has not been rightfully interpreted therein; the red blooded democratic American City does not appear; but in its stead stands a Paris out-Parised and garbed in the habiliments of an imperial Berlin. I know that this is partly due to the limitations of a necessarily conventional presentation on the part of the artists and the warning uttered is against the conventionalism and not at all against the idealism of the conception, supposing always that they are not one and the same. I, personally, have real sympathy with the attitude

**The Burnham "Aphorisms" were collected by Willis Polk.*

of mind which gave birth to the cartoon which Mr. Moore reproduces. (II opp. p.70.) It was induced by drawings of huge, formally cut, boxed trees along the Mall, indicating an utter absence of that sense of "scale" so dear to Burnham's heart. That same lack of scale exists in the pictorial presentation of Chicago's ideal civic center, shown incompletely opposite page 18 of the second volume. This alien cast over Burnham's public work, and over much of his private work also, is due to the foreign training, and often alien ideals, of the assistants he gathered about him. This choice he defended in print, disparaging American ideals and training. Herein, possibly, is the key to his attachment to the American Academy in Rome. As I have indicated, he never had thought out America and American expression thoroughly.

Mr. Burnham had the strong personality that Mr. Moore pictures. His friendships with Captains of Industry, with Merchant Princes, with Railroad Magnates, with Financiers, came from the recognition on their part that the elements essential to their successes inhered in him; that had he so desired he would have been a peer in their own realm. Artists were drawn to him because of his sympathetic appreciation of their individual arts—because of his underlying idea of the unity of the arts.

He worked because a primal impulse urged. He was so situated that he could, and he did, exercise his powers continuously in behalf of the community. That in many instances he gave his services without salary or professional fee does not mean that he was not fully recompensed, in so far as creation in art can be recompensed, for every moment he gave outside of the advancement of his profession. Great commissions came to him through the very fact of his public activities, from the Fair down. Instance after instance might be cited. It was a sort of morbid enthusiasm which led the National Commission of Fine Arts to incorporate in its minutes upon the death of Mr. Burnham the following sentiment which finds an echo in the pages of Mr. Moore's volumes: "All of these public services were rendered without compensation, and at a sacrifice not alone of business opportunities, but also of those domestic hours which were the greatest joys of his life." And so on. No Architect, carrying out a commission, large or small, is ever, or expects ever, to be paid for his art—that of himself which he puts into his work. He is recompensed only for the expense of his organization and overhead and receives but a modest increment to himself. Leaders in the architectural profession always have considered the profession as a means to altruistic service. This has been the watchword of The American Institute of Architects from its inception: To benefit the public and the individual.

Mr. Moore mentions the Institute and its services many times in his pages, and states Mr. Burnham's relation to it. He is in slight error in speaking of Burnham's cause for resigning from the body. (II p.148.) It was not a matter of "making sketches without compensation." The paragraph more properly should read: "Confident of the correctness of his attitude, but conscious that he was being manoeuvred into a position whereby he was compelled to violate the letter and spirit of the code by entering a competition which could not receive the Institute's sanction, he preferred to sever his connection with the Institute rather than break faith (?) with his friends and associates in the bank. This he did, but not without grief and chagrin." As I, who now write these words, was at that time President of the Institute, it devolved upon me to deal with this particular matter. I discussed the situation with Mr. Burnham, asking him to withhold his resignation, which had been addressed to me but which, hoping for a better understanding, I had not presented to the Board until peremptorily ordered by Mr. Burnham to do so. At the interview in which he gave his final decision he concealed from me evidences of his grief but not of a certain irritation due to the fact that a professional body had enacted laws which might interfere with an individual's prerogatives. Other members, to my knowledge, have lost more than Mr. Burnham then stood to lose, by remaining in the Institute and upholding its ethical standards. The Institute was grieved at the defection of Mr. Burnham. Mr. Moore has not studied Mr. Burnham's character in the light of this incident nor in that surrounding the cablegram, bearing upon the Lincoln Monument site, which "created a temporary panic among forces fighting for the Plan of 1901." (II pp.121-2.) These two incidents seem not to have impressed Mr. Moore as they did certain others who were in the thick of the fight for a high idealism, and his reaction to them seems not very profound.

As I stated at the outset, Mr. Moore's tribute to Daniel Hudson Burnham is cast in pleasing mould, and in it is incorporated a full and valuable index. But few errors are in evidence in its many pages. May I correct one of importance? Mr. E. L. Lutytens appears as Lutgens (II p.141); and may I ask if the American Academy of Arts and Letters has established a fellowship class? (II p.123.)

But these are small matters in so monumental and excellent a work which will be read with especial interest by one who is at all concerned with the battle which the Fine Arts are waging against sordid and selfish politicians and political interests

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and hopeless individuals in a land in which, as I have already indicated, there is no national Art life, instinct or inclination. But there is cause for hope when we cast our eyes back over the altruistic acts of the great artists and men of affairs who walk in the pages of Mr. Moore's volumes and think of Roosevelt, Elihu Root, McMillan, Newlands, Slayden, Evans, and others, politicians yes, but politicians with ideals and concerned at heart with the Art of a Nation.

A SMALL CHILDREN'S BUILDING FOR A COUNTY TUBERCULOSIS SANATORIUM

By T. B. KIDNER

INSTITUTIONAL SECRETARY, NATIONAL TUBERCULOSIS ASSOCIATION

BECAUSE the researches of tuberculosis specialists have revealed the fact that the majority of civilized people become infected with tuberculosis in childhood (although in many cases the disease never becomes clinically active), great attention is now being paid to the care of children suffering from, or suspected of having, that dread disease.

For children who are known to have been exposed to infection from tuberculosis, or are below par in their bodily condition and therefore liable to develop it, (the "pre-tuberculous stage"), such agencies as the Preventorium, the Open-Air School, the Open-Window School and the Summer Camp have become fairly familiar. All these agencies are, however, only for children who are not "active cases"; that is to say, even if the primary infection has developed conditions which enable a skilled physician to make a definite diagnosis of tuberculosis, their presence in one of these special institutions, or classes, would not necessarily be a menace to the other children. At the same time, once a definite diagnosis has been made, the child should be given proper treatment, even if he (or she) continues to attend one or other of the school agencies named above.

If, however, the child's condition is such that, either because of his weakened condition, or because of the presence of infective bodily discharges, he must receive constant medical and nursing care, his removal to a properly equipped hospital of some sort is imperatively indicated.

To meet the need of accommodation for such cases, Children's Wards in general hospitals, and in tuberculosis hospitals and sanatoria, have been established in many urban centers. Outside of the cities, the responsibility for the care of such cases usually devolves on the county medical authorities. This responsibility can be met by the provision of a Children's Unit at the County Hospital or the County Tuberculosis Sanatorium, and it is the purpose of these notes to make some suggestions for the planning of such a unit.

The floor plans shown in the accompanying illustrations were prepared with the idea that they might serve as a basis of discussion, and for the instruction of architects, by sanatorium authorities, undertaking the provision of a Children's Building.

In the writer's experience, the architect who is called upon by a Sanatorium Board to design an institution is faced with one of two dilemmas (though perhaps that is rather a harsh term); namely, either he is given no instructions whatever, or, through the influence of some local faddist, is given such minute, fixed details as to render it most difficult for him to approach the problem in the proper spirit.

Comparatively few architects throughout the country are called upon often enough to design hospitals or sanatoria to specialize in that field. Only "once in a blue moon" in the general run of practice is the average architect called upon to design a tuberculosis sanatorium, or other building for the institutional treatment of the disease; and, when a commission in that line does come along, sources of information on the subject are all too few.

It is trite to say that, as in any other kind of building, the designers must know thoroughly the purpose and the routine of administration of a building in which tuberculosis patients are to be treated. The difficulty is, however, that as the knowledge of the disease advances, corresponding changes are constantly being made in buildings and equipment.

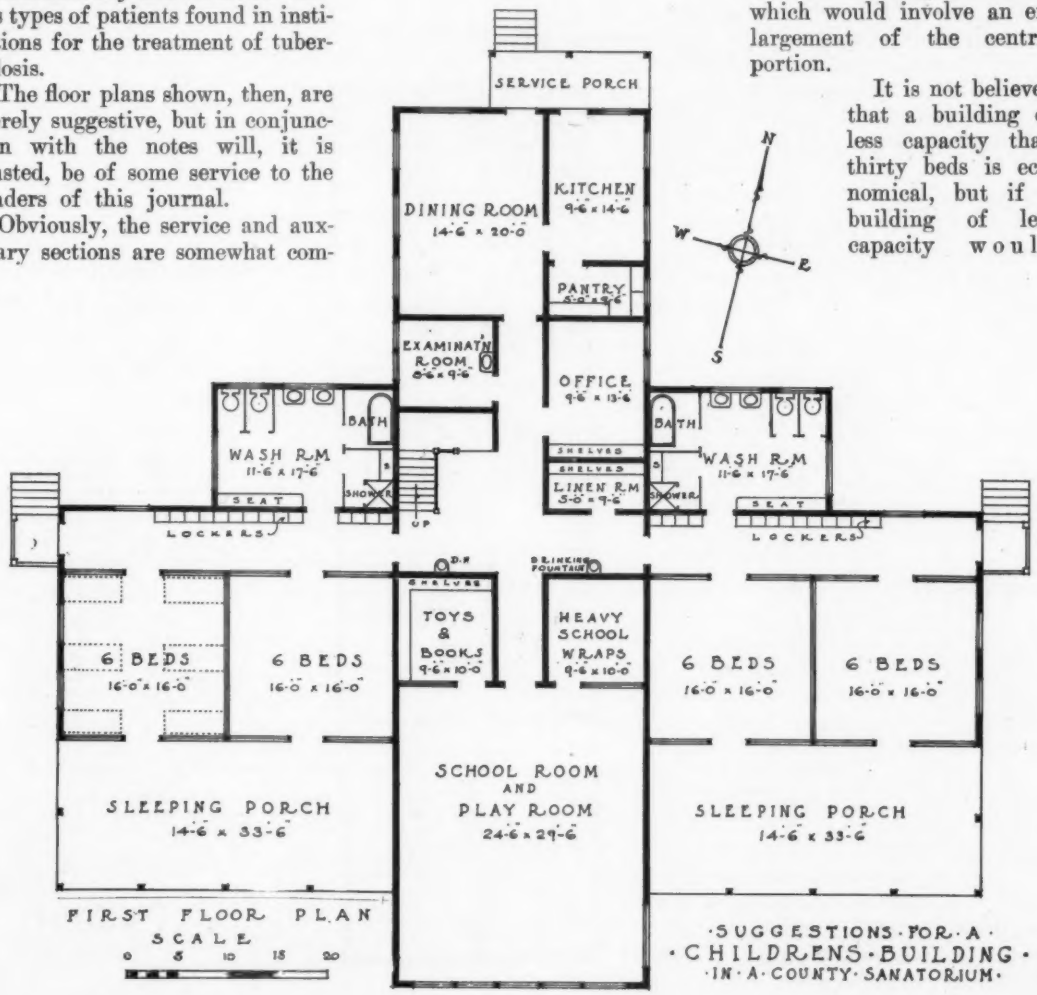
For example, no authority on tuberculosis sanatorium construction today would countenance the erection of the flimsy type of building, all too appropriately termed "shacks," which up till a very

recent period, were considered quite suitable for the housing of tuberculous persons.

To meet the need of many architects for competent advice on the subject, the National Tuberculosis Association maintains an Institutional Construction Advisory Service which, with its files of blueprints, is freely at the disposal of any one who is concerned with problems of the planning and equipment of structures to accommodate any and all of the various types of patients found in institutions for the treatment of tuberculosis.

The floor plans shown, then, are merely suggestive, but in conjunction with the notes will, it is trusted, be of some service to the readers of this journal.

Obviously, the service and auxiliary sections are somewhat compressed; the isolation quarters being quite small. It is believed, however, that all essentials are included in the plans shown and that, as indicated above, they may form the basis of instructions rather more definite than an architect usually receives from county hospital or sanatorium authorities.



Capacity of Building

Thirty children can be accommodated at one time; twenty-four on the first floor, (six each in four rooms) and six on the upper floor, (three on each side of an open ward, divided by a partition to separate the sexes.)

The three additional beds shown in the isolation section cannot be counted upon to increase the capacity, as they must be kept ready for emergencies.

The capacity of the building could be increased by adding another room at each end on the ground floor, which would involve an enlargement of the central portion.

It is not believed that a building of less capacity than thirty beds is economical, but if a building of less capacity would serve, the plan might be re-arranged so as to provide all the accommodation on one floor.

It is scarcely necessary to say that all buildings in which bed patients are accommodated must be of fire-proof construction; although composite or slow-burning construction may be permissible in buildings of one story.

First Floor Accommodation

It is intended that boys shall be accommodated in one wing and girls in the other.

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Bedrooms

Except in very severe winter weather, the children will sleep on the porches, but the doors of the 6-bed rooms must be wide enough (3 feet 6 inches) to allow for the cots being wheeled into the rooms for dressing, preparation for going to bed, etc. Radiation should, therefore, be provided in the rooms. Threshold strips must be omitted from the doorways. It should be possible, however, to flush the rooms with fresh air and to that end Monitor transom sashes are indicated in the partition between the rooms and the corridor (close to ceiling); sashes to open being also provided on the porch side of the room.

It should be noted also that a ceiling vent is shown at each end of the corridor. This vent should communicate directly with the open air; the exterior opening being covered with one of the several devices on the market for preventing a down draft.

The best material for the floor covering of the 6-bed rooms is heavy battleship linoleum, cemented all over to the concrete floor surface.

The partition between the two rooms should be glazed, (fixed sashes) from a height of 4 feet 6 inches above the floor to the ceiling.

Sleeping Porches

The sleeping porches should be properly screened to exclude flies and mosquitoes. Canvas shades are necessary to exclude the sun in hot weather, but should not extend completely to the top of the openings, so as to interfere with the ventilation.

Smooth concrete, or concrete finished with one of the mastic or other surfacing compositions, is suitable for the floors of sleeping porches.

Corridors

The corridors should be heated. Heavy battleship linoleum is the best covering for the floors of the corridors in the rear of the 6-bed rooms. The floor surface of the corridor in the central portion should be of terrazzo, tile, marbleoid or other impervious material.

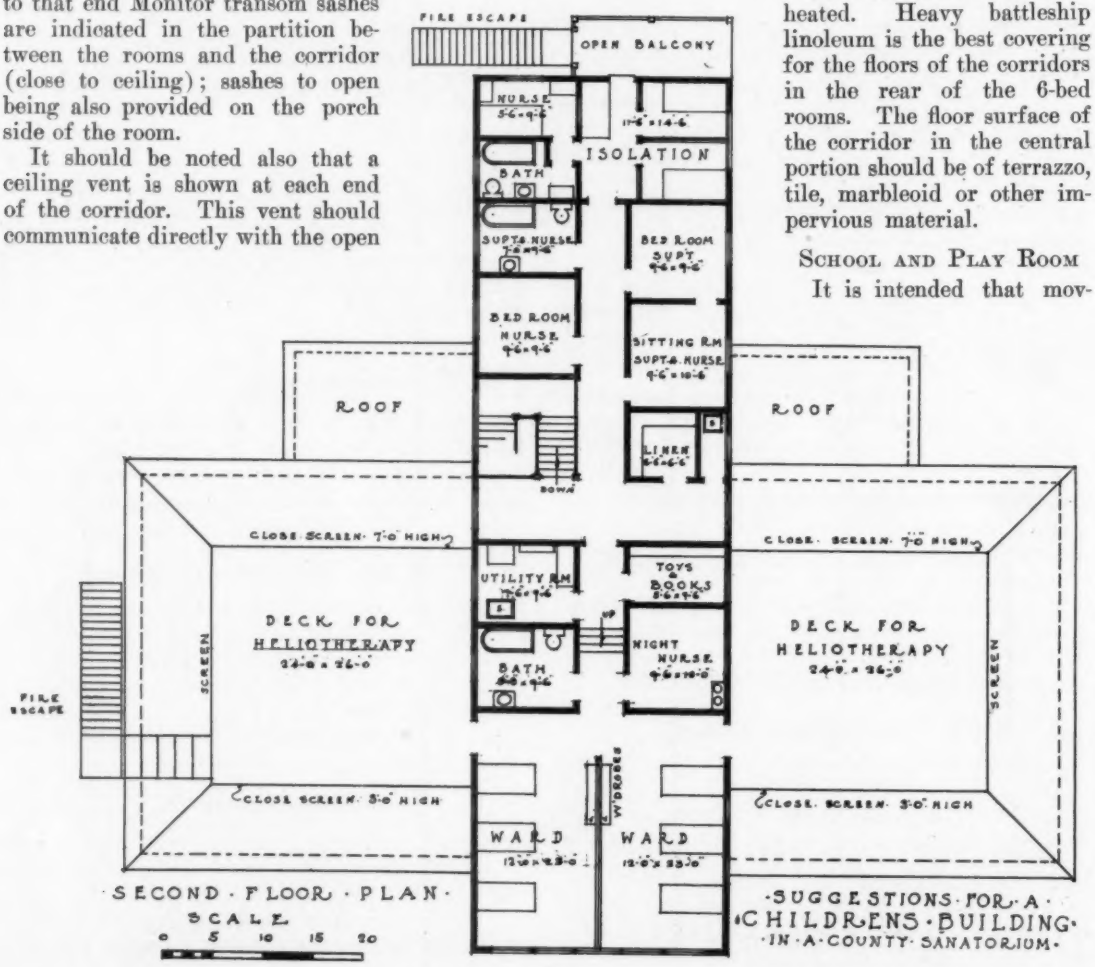
School and Play Room

It is intended that movable desks of the Multhrop, or similar, type shall be used for school purposes and pushed to one side when the room is used for play and recreation. It should be noted that no window is provided on the west side.

The floor of the school room may be either of hard wood, laid over the concrete; or, preferably, of heavy battleship linoleum.

Janitor's Closet

No janitor's closet is shown on this floor but could well be placed under the stairs, provided



that a vent to the outer air is installed.

Office

If it be deemed necessary, the room marked "office," might be equipped as a small operating room; the surgeon's scrub-up sink, the sterilizer and a hopper sink being installed on the side of the room next the linen room, and the operating table in front of the window.

It is better, however, that operative cases should be taken to the main operating room of the institution; except in a children's unit of large capacity, when a special operating room might be justifiable.

A still better plan is to arrange that cases requiring operative treatment should be removed to the local general hospital for the operation, and for the period of surgical convalescense, the case to be returned to the sanatorium for the prolonged treatment.

Kitchen and Pantry

The floors of these two rooms should be either of concrete finished with mastic or other smooth surfacing composition; or of quarry tile.

Dining Room

The remarks with regard to a suitable floor for the School Room apply also to the Dining Room.

Note: It is not good practice for children to take their meals with adult sick persons in the main dining room of the institution. Quite apart from the great amount of work involved in putting on outer garments, rubbers, etc., in wet or winter weather, the effect on the children of contact with sick adults is not desirable. Therefore, it is better to arrange the building so that the children live in it entirely.

Fly Screens

All windows and other external openings must be properly screened.

Windows

The best form of window for a sanatorium is one in which the sashes are pivoted on the sides to open outwards, the wire screens being inside. Sashes opening in this way can be kept open in stormy weather longer than ordinary sliding sashes or casement type windows, without subjecting the inmates to a direct draft.

Height of Ceilings

With the exception of the School Room, all rooms on this floor should be not less than 11 feet in height.

The School Room ceiling must be about two feet higher than the rest, so as to allow for patients in the infirmary wards on the second floor being wheeled out on the level to the decks for heliotherapy treatment.

Note: Pulmonary tuberculosis is not common amongst children, the bulk of the cases requiring hospital treatment being sufferers from glandular and bone tuberculosis. In the treatment of these forms of the disease, great reliance is placed on exposure to the direct rays of the sun, unimpeded by glass; hence the necessity for the provision of suitable space in which such treatment can be given. It will be noted from the plan that the decks are screened from the north wind and that the screens at the ends are diminished gradually to meet the front balustrade, or screen, which is about 3 feet high.

Because patients taking sun baths are generally naked, (with the exception of a breech clout) the space for heliotherapy treatment should always be arranged so that it is not in sight from the other parts of the institution.

Second Floor Accommodation

Front Portion

This part of the upper floor forms the infirmary unit for children confined to bed. The patients' quarters consist of one large room, divided into two wards, (Boys and Girls), by a partition six feet high as shown in the plan.

On each side of the room is a level deck where the sun treatment can be given.

The usual nurses' and service rooms are shown in the plan.

Rear Portion

This part of the upper floor contains the living quarters for the staff; also a small isolation section for cases of infectious disease which may develop in the institution, or for the observation of a suspicious case on admission.

Fire Escapes

Two are necessary; one on the rear and one on the side, as shown in the plans.

Note: The foregoing article was contributed by the Institutional Construction Advisory Service of the National Tuberculosis Association, which is the national headquarters of the fight against tuberculosis in this country. From Thanksgiving Day until Christmas there will be conducted the annual Christmas Seal Sale, which provides the funds for the local, state and national educational work which is slowly but surely ridding the United States of the "Great White Plague."

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SOME FUNDAMENTALS IN HOSPITAL PLANNING--PART I

BY HENRY C. WRIGHT

THE planning of a hospital involves many and diverse problems. If the trustees of a proposed hospital were able to place in the hands of an architect a schedule of requirements the task would be somewhat simplified. Seldom, however, are trustees able to submit a complete list of their needs. This arises from the fact that the trustees are usually busy business men, little accustomed to measure social and medical needs and also from the fact that the members of the medical staff at times measure needs in terms of their own interests.

The writer recently, in endeavoring to formulate a hospital program for the trustees, noted that the existing children's service was unusually small, and the medical staff did not propose to increase it materially in the new hospital. This was due to the fact that the staff did not contain a pediatrist, and did not intend to add one; the general surgeons and internists were not especially interested in children. Nevertheless, the new hospital should meet a community need by furnishing more beds for children. If the staff contains a specialist in X-ray, commodious accommodations will be asked for. If no such specialist is on the staff, the X-ray needs are likely to be under-emphasized.

Regardless of the needs of the community, occasionally the staff will argue against a dispensary, since they are loath to give their time to it, and because it may tend to lessen the private practice of some doctors.

Owing to many factors similar to those above referred to, it is difficult to determine what the hospital should be in variety and size of services. For these reasons, not infrequently an unsolved problem is thrown over to an architect, which places him in a difficult position. His only recourse is to insist that the trustees appoint a special committee from the medical staff who shall be responsible for voicing the needs of the staff as a whole. After he has received their recommendation, he will endeavor to estimate the probable income from the proposed wards and private room patients, weighed against the probable operating costs. These facts the trustees should have in hand as a basis on which to determine their probable resources and liabilities. In presenting the case to the trustees, the architect should not only try to adjust the character of private rooms to the class of patients likely to patronize the hospital, but he should also measure the probable reduction in operating costs of an additional expenditure for toilets and lavatories designed to reduce the labor of nurses. A bath in connection with a private room may be considered a little-used luxury. A toilet, however, is not only serviceable to the patient, but also saves many steps for the nurse.

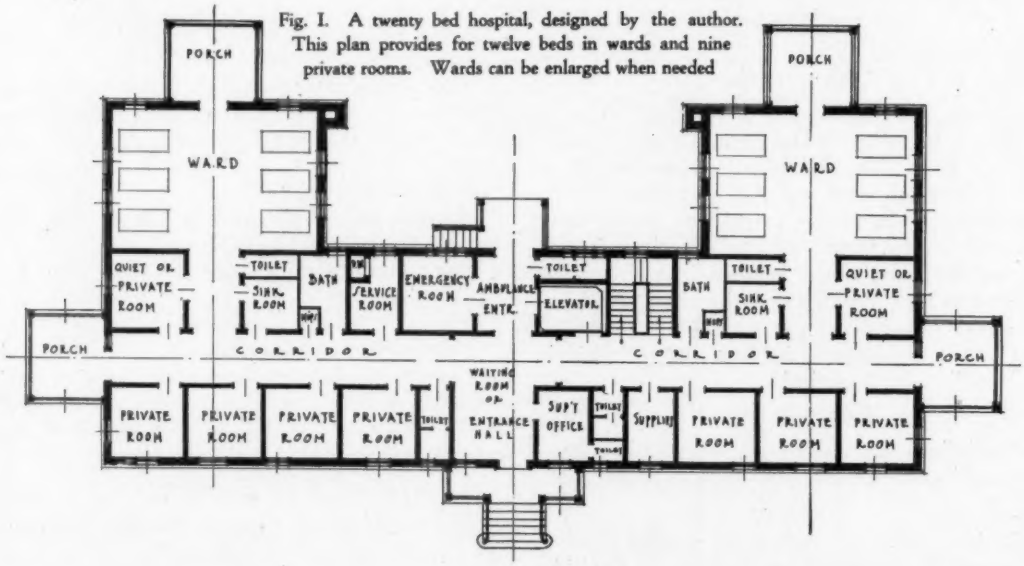


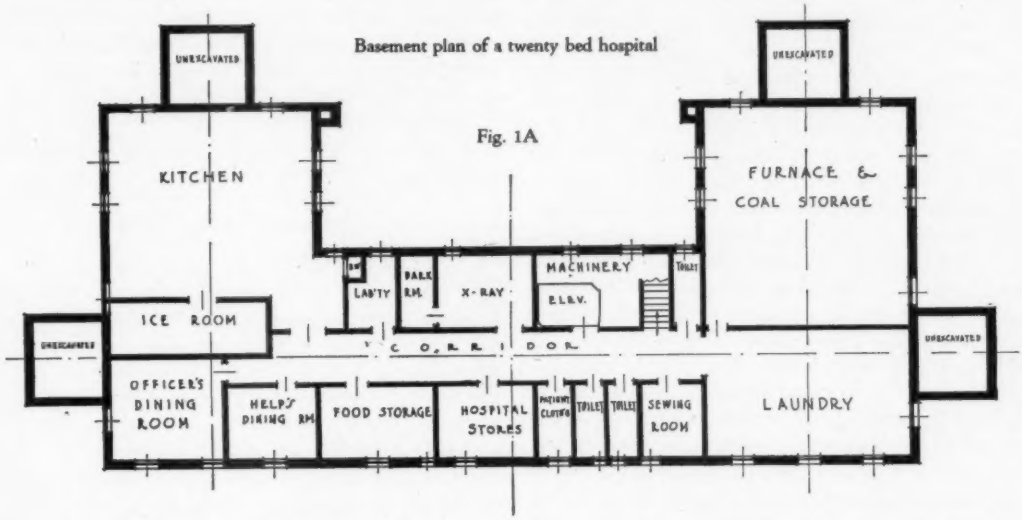
Fig. I. A twenty bed hospital, designed by the author. This plan provides for twelve beds in wards and nine private rooms. Wards can be enlarged when needed

These may be placed between rooms, and be used alternately by either room, but are at all times of service to the nurses.

A nurse serving six patients from seven to eleven a. m., will walk on an average from 4,000 to 7,000 feet. A proper location of service facilities may greatly reduce the time and distance necessitated in such service. A duplication of service rooms and facilities may mean added cost to the structure, but will greatly reduce subsequent operating costs. Thus, a general policy as to costs must be determined by the trustees.

Basement plan of a twenty bed hospital

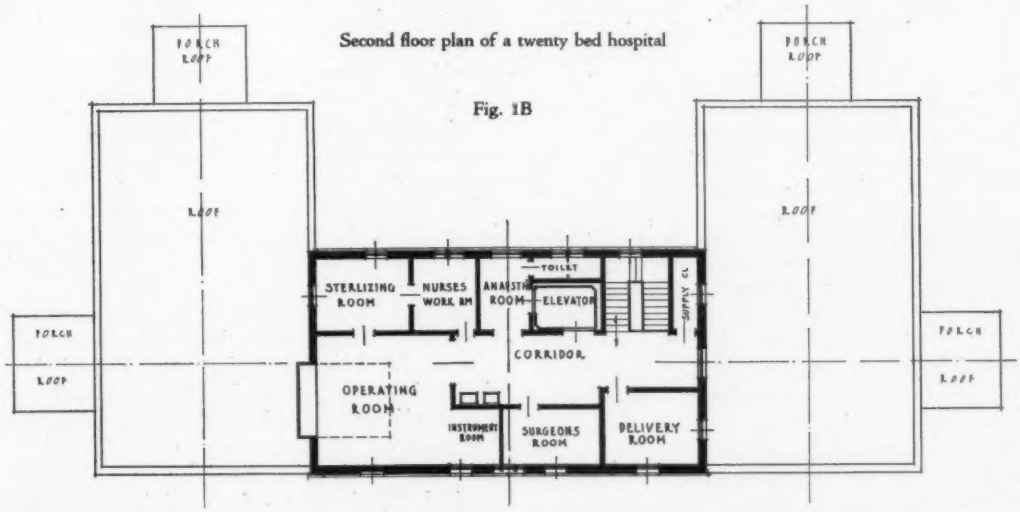
Fig. 1A



used jointly for two or more services. For instance, in one small hospital the writer visited, the X-ray machine was in a room used also as the superintendent's office. This location was not a serious handicap, since the superintendent was also the X-ray operator. In most hospitals under fifty beds, the superintendent, a woman, is superintendent of nurses, instructor of nurses, operating room nurse, X-ray operator, and general plant manager. When a hospital is so headed, facilities may be more readily combined, since but one facility is used at a time.

Second floor plan of a twenty bed hospital

Fig. 1B



In many regards a large hospital is easier to plan than a small one, since in a large hospital all modern diagnostic facilities will be adequately provided for. In a small hospital, most of the facilities usual to a large hospital are needed, yet the funds are so limited that the spaces must be

Having determined the general character of the hospital to be built the architect can then give attention to arrangement of entrances, administration spaces, laboratories, food service, auxiliary rooms and all the many and complex details of arrangement and accessories.

Entrances

ENTRANCES and exits should be as few as practicable, in order more easily to control the exit of employees. The main entrance for visitors, when possible, may be in two places, one for the visitors to ward patients and another for visitors to private room patients. If two entrances be provided, they should be so arranged that they will converge on one information desk. If this be not done, additional clerical help will be required. A dispensary entrance should be separated from the main entrance, and yet in a prominent and easily accessible place. Where feasible, it is advisable to provide another entrance for patients walking to the hospital. This entrance should, if possible, lead to an admission service, to which an ambulance entrance also leads. The ambulance entrance in small hospitals should be adjacent to the dispensary, so as to reduce nursing service. The ambulance entrance should be shielded from the view of the public, and also from the patients in the hospital. Likewise, the door from which bodies are removed by an undertaker. A service entrance should be, if possible, in the rear of the hospital,—at least out of view of the street. An endeavor should be made to have the service entrance far removed from patients' quarters.

The ambulance entrance should be so placed that the visiting public will not come in contact with it. Patients being removed from an ambulance always attract attention, and will cause a congestion of people if they have access to the ambulance. Removal of bodies from the wards to the morgue should be likewise guarded. Where possible, these functions should be performed on a floor below that used by the visiting public. If such arrangement can be made, on this floor also all transportation of supplies can take place.

Waiting Spaces

WAITING spaces are of prime importance. Most hospitals have designated visiting days for ward patients. On these days friends of patients frequently come to the hospital long before the hour for visiting. If insufficient waiting room be provided, the friends will collect about the door, creating somewhat of a nuisance, and in inclement weather they may suffer. In communities where many foreigners come as patients to the hospital, it is advisable to provide a general waiting room with a seating capacity about seventy-five per cent. of the ward capacity of the hospital. In this waiting room, should be the information station. Entrance from the waiting room to the wards should be controlled from this information station. In addition to the general waiting room, there should be two to four waiting rooms or alcoves wherein friends may wait during an operation.

Adjacent to the entrance for the friends of private patients, should be at least two waiting rooms. These need not be large, since visiting to private patients is not restricted to special days or hours. Thus, their friends do not come at any one time in large numbers.

On each floor of a private pavilion, should be additional waiting alcoves wherein friends may wait in case a patient cannot be seen as soon as the friends arrive.

Telephone booths should be available to all waiting spaces on the lower floor.

Administration Spaces

ADMINISTRATION spaces in size will, in the main, be in proportion to the size of the hospital. In a hospital under fifty beds, one fair sized room will answer the purpose of all administrative functions. Accounts and records are usually very limited in a hospital of this size. Larger hospitals require a separate room for accounts, one for records, and various offices for the assistant superintendent, dietitian, housekeeper, social service, superintendent and assistant superintendent of nurses, etc. In short, the scheme of administration and management must be scheduled before the spaces can be allocated.

Food Service

TWO primary considerations should be kept in view in planning the food service for a hospital. It should be so arranged, first, that the food will get to the patient hot; second, that there should be as little waste as possible in labor and food.

The kitchen should be located centrally as regards the patients, and also adjacent to the kitchen should be the dining room for the officers and help. In a small hospital the patients' trays can be set up in the main kitchen and delivered from there direct to the patients. In a large hospital, owing to the distance of the patients from the main kitchen, it is necessary to adopt some other method of food distribution. The food may be carried in thermos trucks from the kitchen to the patient, or it may be taken to food service rooms adjacent to each ward. In these rooms the trays are set up, and from there delivered to the patients. A decision must be reached as to the method that is to be employed before plans can be made.

The place and manner of washing dishes is another function which must be determined. They may be washed by hand in each food service room, or transferred from and returned to the main kitchen and there washed in a power washer. The

method to be employed will condition the plan both of the main kitchen and the food service rooms.

Again, a decision must be reached as to whether the food, after it is taken from the range and pending the time it is to be served, is to be kept hot in steam tables or in thermos containers.

In determining the set equipment of the food service rooms, another question must be decided; viz., where special diets are to be prepared. If they are prepared in the food service rooms by nurses or maids, a suitable equipment in refrigerators, stoves, etc., must be provided. If they are prepared and sent from the main diet kitchen in or adjacent to the general kitchen, less equipment will be needed in the food service room.

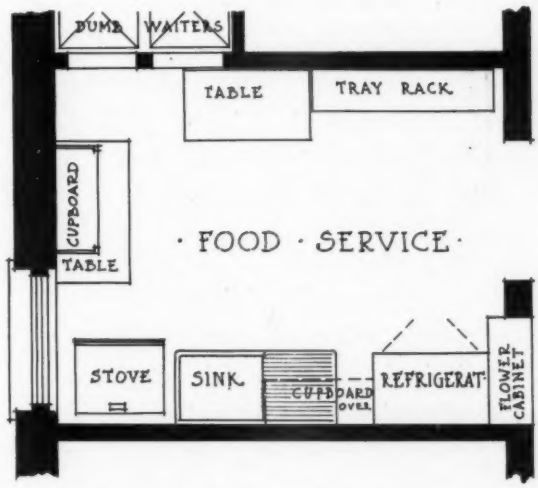


Fig. 2. This food service room assumes a service of food by means of Thermos boxes, making its equipment very simple. Flower cabinet opening into the corridor is backed against the refrigerator by which it is cooled

The foregoing matters must be decided before the main kitchen or the serving room can be planned. One factor, however, remains constant; viz., that room must be provided adjacent to the wards for the bedside trays, cutlery, condiments, napkins, etc.

The architect should raise each of these questions, and receive a decision, preferably in writing, from the hospital authorities. The writer is familiar with one expensive hospital recently built, which found it necessary to expend several thousand dollars to modify its system of food distribution. The system provided for in the plans was unworkable.

Laboratories

FOR diagnostic purposes, small hospitals need about the same laboratory facilities as do large ones. The small hospital, however, cannot afford the space for such purposes, as can a large hospital. Thus, in a small hospital it becomes necessary to use one space for several functions. In a very small hospital it is feasible to place the X-ray equipment in the room used for the superintendent's office by somewhat enlarging the room, and providing a rolling partition. Such an arrangement, however, is not desirable if a separate room can be afforded. The minimum requirement is one room, to be used for radiographic, fluoroscopic and cystoscopic work; adjoining this should be a dark room and stock closet. According to the needs of the hospital and the funds available, these should be expanded to include separate rooms for treatment, fluoroscopic work, cystoscopic work, fracture setting, view, preparation, office, records and library, stock room, plate storage, waiting room, dressing booths.

Pathologic laboratory work should have the same range in a small hospital as in a large, but it is impracticable to afford either the space or equipment in a small hospital as provided in a large one. The minimum requirement is one room with a sink, table, refrigerator and gas. In this room the usual routine determinations, including blood counts, can be made. Little beyond this is likely to be done, since the work is usually carried on by an attending member of the staff. A hospital of from one hundred to two hundred beds should have at least the following separate rooms for pathological work: chemistry, bacteriology, metabolic work, routine work by the house staff, office, records, museum, animals, a refrigerator accessible from the corridors, where nurses and house staff may secure culture media and deliver specimens at all hours.

Autopsies are seldom performed in a small hospital. A large hospital should have an autopsy room provided with a suitable table with drain, an ample sink, a cupboard for containers and instruments.

(*To be continued*)

Doorway in Bristol, Rhode Island

(See reproduction of original drawing by O. R. Eggers on opposite page)

BRISTOL, R. I., in the opinion of many antiquarians, is located on or near the site where the Northmen in the year 1,000 and later, built the dwellings mentioned in the Icelandic Saga.

This picturesque town on Narragansett Bay was first settled by the whites in 1680 and was incorporated as a town in 1746. It is, therefore, among the oldest of our New England settlements. The boat building industry has for many years flourished in Bristol, and the inhabitants, many of whom can trace their ancestry to the early settlers, have maintained, as far as possible, all the earlier characteristics of this interesting town.

The doorway sketched by Mr. Eggers and presented on the opposite page, is typical of the large amount of good architectural detail in Bristol that has survived the many changes that have there been made.

A DOOR-WAY IN BRISTOL, R. I.
THE AMERICAN ARCHITECT Series of Early American Architecture

XUM

PRACTICAL PROBLEMS IN ARCHITECTURAL PRACTICE

Richard E. Schmidt, an accepted authority on hospital design, interestingly refutes the statements of a hospital superintendent, whose experience should have led him to wiser conclusions

To the Editor, "The American Architect"
Sir:—

During the course of an article entitled "Planning a Hospital Synthetically" contributed to the August issue of *The Modern Hospital,* Mr. Louis J. Frank, superintendent of Beth Israel Hospital, New York City, states as follows:

"In the construction of the hospital, it seems to me that the architect should serve in the capacity of a consultant. By this I mean that the architect should be instructed exactly as to what we desire, rather than that we should be compelled to mould ourselves into quarters which he may think suitable for us. An architect is a theorist. He can see to it that the structural lines are consonant; that there be no medley of Doric, Ionic and Corinthian columns, that the sense of artistic proportion be satisfied, that grace and beauty and service be planned to make a harmonious whole. But he is unacquainted with the practical work of the hospital kitchen, the X-ray department, the operating room, the wards, etc. He cannot conceive of the importance of little things which make for efficiency, of the interrelation of the various departments, of the proper division of each department into its compartments."

Not one of the many Architects in this country would willingly rest quietly under an aspersion so unjust and a statement so very wide of the facts. Mr. Frank's statement that the Architect is a theorist and "that he can see to it that there may be no medley of Doric, Ionic and Corinthian columns" indicates considerable ignorance regarding the functions and duties of the Architect. If he holds that belief after having seen the Woolworth Building, the Pennsylvania Station and other well known New York buildings, he will have set a measure of his capacity to understand.

Has he any conception of the arduous labors intervening between the first sketches and the completed building?

To the Architect in successful practice it sometimes seems as though it was all business and no theory, not to mention but little of æsthetics, and while it is obvious that the Architects engaged should be instructed in the requirements and purpose of the building, they will not lose sight of the proportionate values; that is, of the larger problem of efficiency and operation and comfort of patients while studying the detailed requirements of the scullery. Such instructions cannot be formulated by the average hospital superintendent, because of the limitation of his experience and knowledge; nor can they be rigidly adhered to after being drawn.

Every project (especially so the hospital) has limitations as to funds, site and purpose and this cannot always be moulded to fit the rigid program.

Mr. Frank's intimation that Architects unacquainted with hospital details would remain in ignorance is an aspersion of the order of the remainder of his remarks.

Buildings are constantly being promoted and erected that are absolutely unique inasmuch as they are the first of their type to be built. The perfection of their detail and their adaptability to the purpose of their erection have always been the result of the thoughtful and competent ability of the Architects to design them, and their excellence has been widely proclaimed. This experience in new types of buildings is constantly being had by every large architectural office in this country. Each has been a model of its kind, and has served as such for every subsequent development of a similar type.

The Architect unfamiliar with hospital practice must obviously familiarize himself with its numerous details. Every Architect experienced in this very technical specialty has been trained to analyze all the elements of convenience, economy of arrangement and operation of the various structures, the result of his creative work. It is quite obvious that Mr. Frank fails to understand that experience teaches the Architect to apply his knowledge to any of the problems of every kind of building in which he engages, and enables him to produce a logical, orderly, convenient, workable building of any character which he may undertake.

It is this experience in many different buildings of the same type that creates the expert Architect. This wide training enables him to visualize space requirements without employing the kindergarten methods of so-called hospital experts in the furnishing of a room or a sequence of service rooms, a method which Mr. Frank states he has used and warmly recommends.

Just now when time is such an important factor in every building operation and means money in a more important sense than it ever has before, a greatly increased demand exists in every type of

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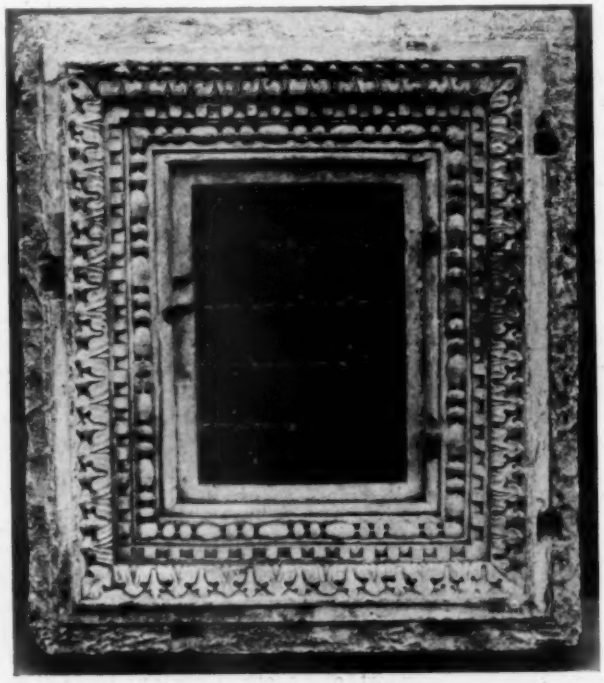
building for expert knowledge based on the most practical experience. The man who has all these facts and this wide experience at his command, who has available records and data of past performances to which he can instantly turn, who knows, as he knows his multiplication table, the dimensions of apparatus, their uses, rates of production, and every one of the intricate details that enter into the daily operations of every hospital building, is enabled to work with absolute certainty and save for his clients large sums of money that are always wasted through protracted and preliminary study of problems which he should know off-hand. Further, while conserving every element of time, the Architect who specializes in any type of building is able to bring to the solution of his problems such innovations and large improvements as his wide technical knowledge will suggest.

It is quite clear that Mr. Frank fails to grasp the real function of the Architect, or his ability actually to visualize his structure in three dimensions and to live the part of the technical operator or occupant of the structure that has been given to him to design. It may be a hotel where the management seeks to inaugurate new methods of service, a theatre with all the various complications with which the modern theatre building surrounds itself, a rolling mill adapted to new forms of machinery and the efficient and quick handling of unwieldy billets of iron, or a home in which the Architect hopes to lead the occupants along the lines of modern domestic life and those refinements which every Architect knows have done so much to elevate the domestic standards of the American people. And it may also be a hospital. And if it is a hospital, the Architect must be able to visualize and mentalize the cold, calculating, business-like attitude of those who operate these institutions, and the nervous, timorous condition of the patients who are treated there, and, moreover, it is fortunate that those connected with hospital management throughout this country, do not share the same opinion as to the value of the Architect's services, as advanced by Mr. Frank.

Today the modern hospital is a refuge for all classes and conditions of the people. They know that they may find there the most expert medical service, the most complete arrangement for their comfort and well-being; the gruesomeness, and even horror, with which a hospital was regarded not more than a quarter of a century ago, has been transformed into an attitude of confidence on the part of the incoming and outgoing patients.

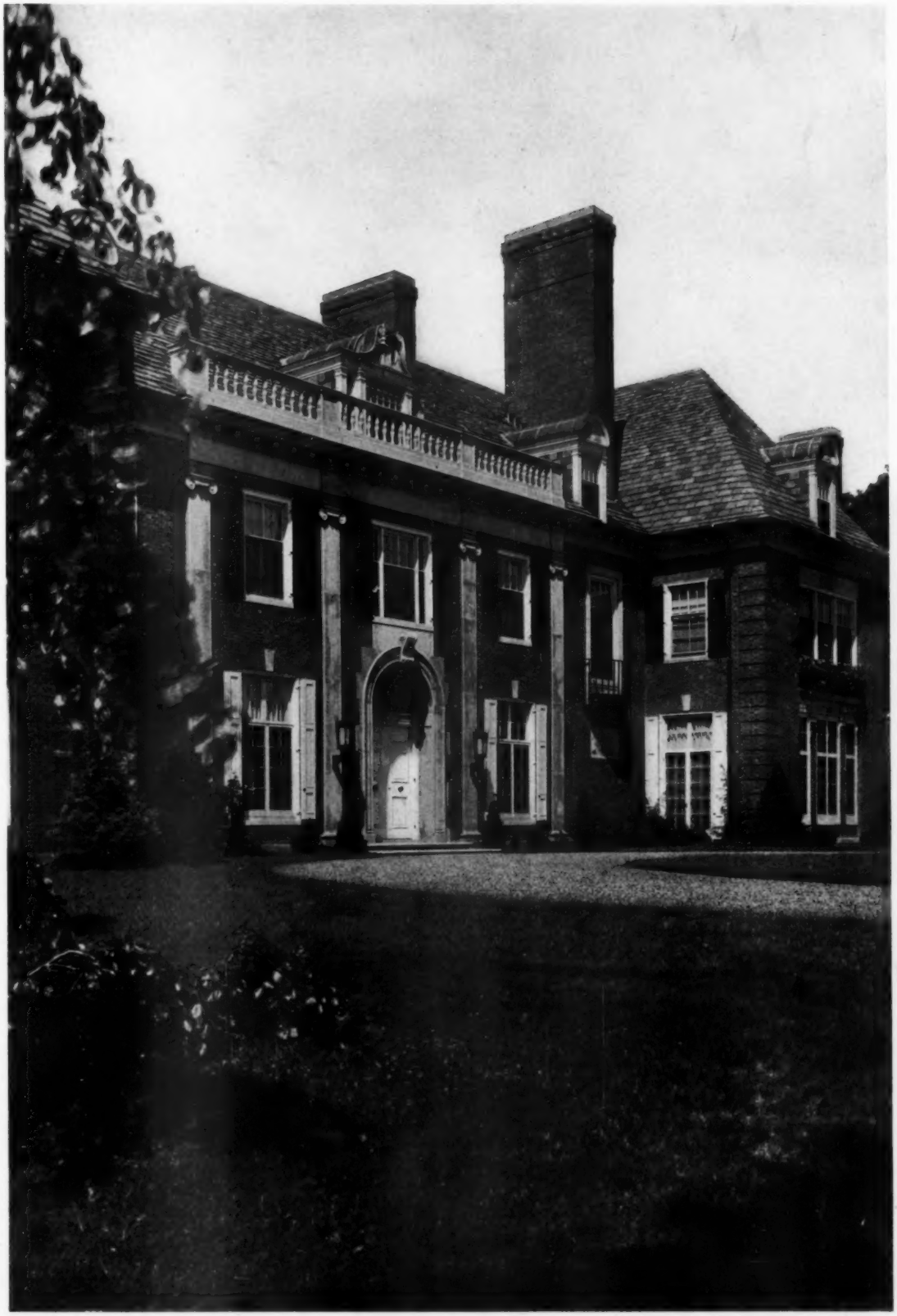
It is not too broad a claim to state that all of these desirable conditions have been largely brought about through the careful consideration and the very deep mental study that every Architect who has specialized in this type of building, has given to his work.

RICHARD E. SCHMIDT.



ITALIAN
XV CENTURY
WINDOW

Constructed
of Marble and
Iron



HOUSE OF LELAND H. ROSS, MADISON, N. J.

BEHR & SMITH, ARCHITECTS

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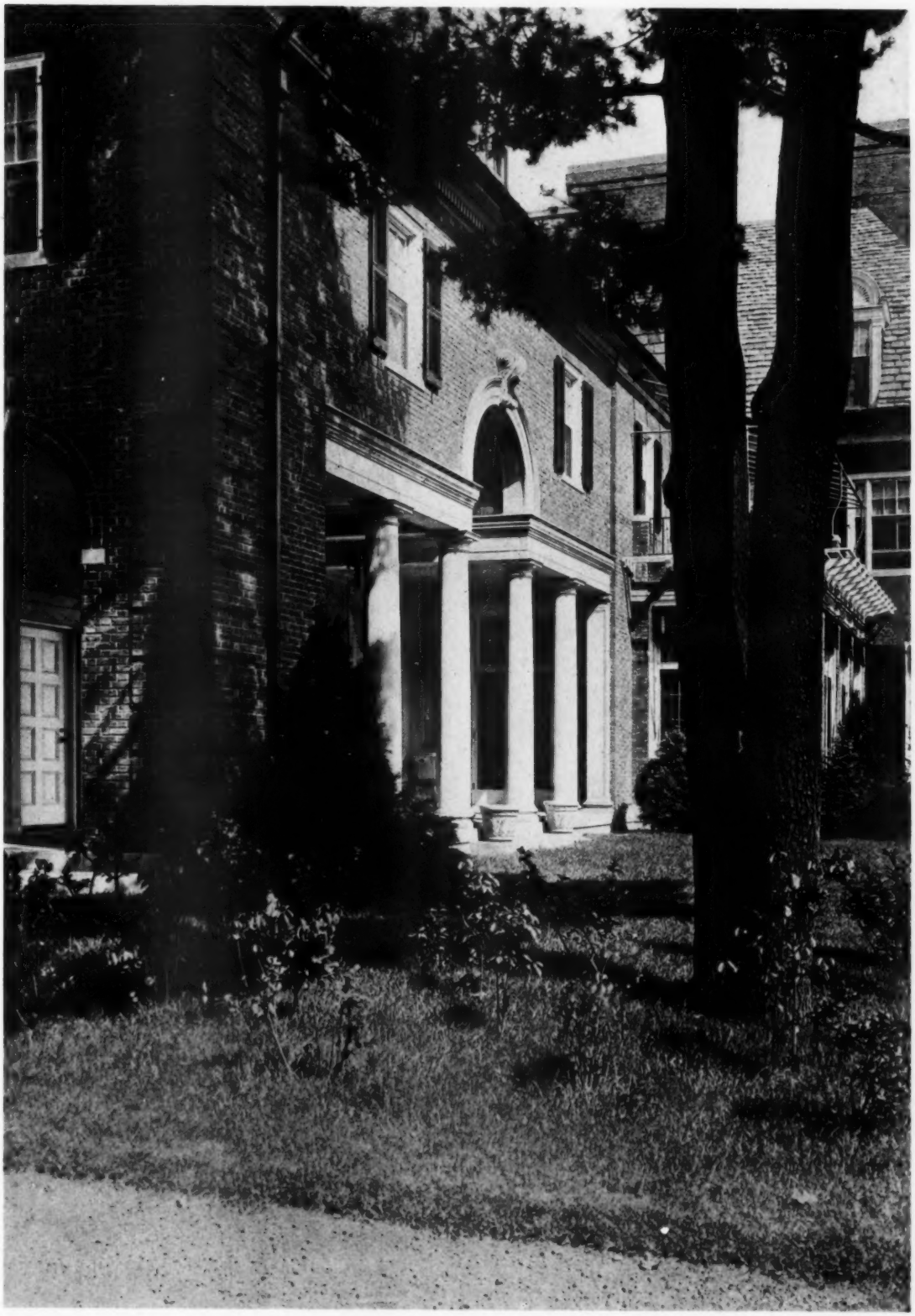

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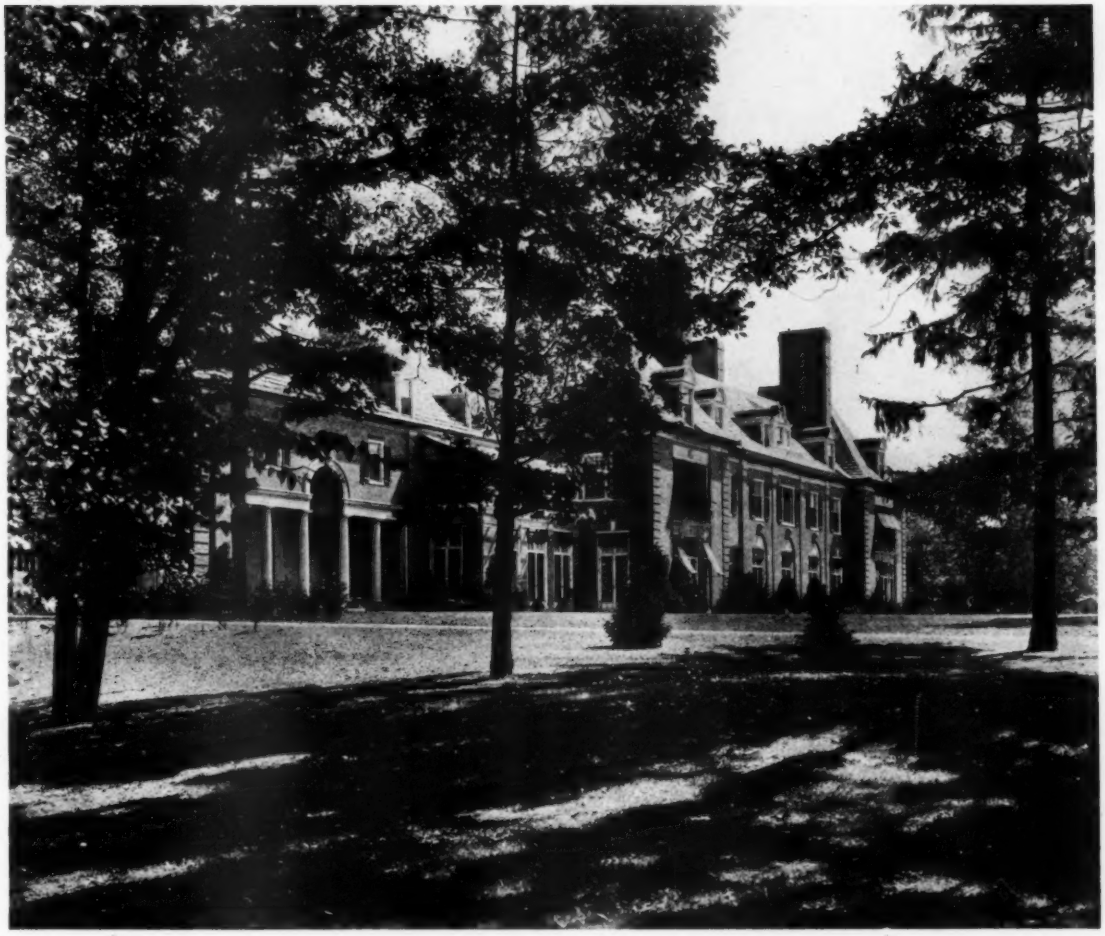

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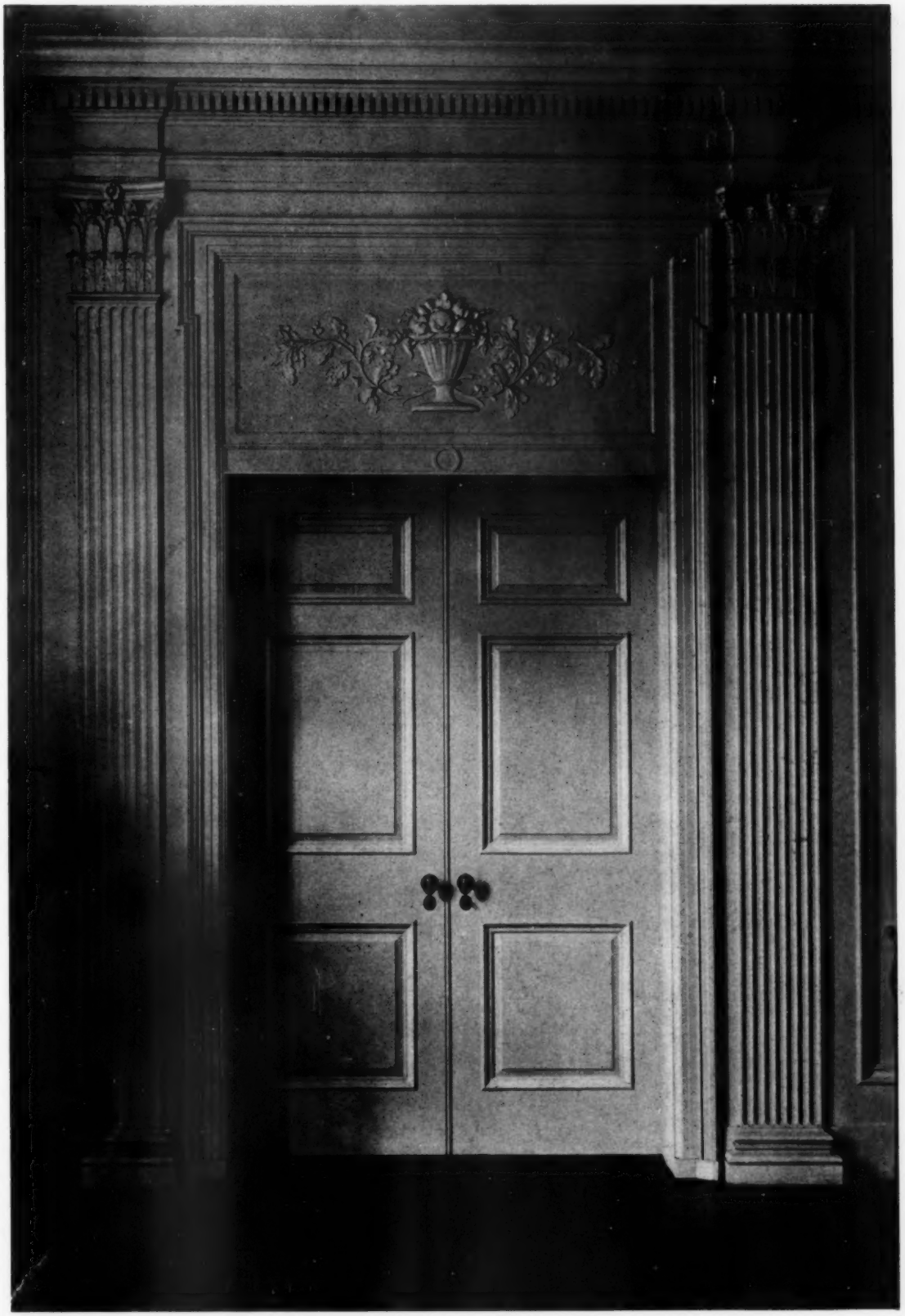

DETAIL OF DOOR IN HALL

HOUSE OF LELAND H. ROSS, MADISON, N. J.

BEHR & SMITH, ARCHITECTS

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MORNING ROOM

DINING ROOM

HOUSE OF LELAND H. ROSS, MADISON, N. J.

BEHR & SMITH, ARCHITECTS

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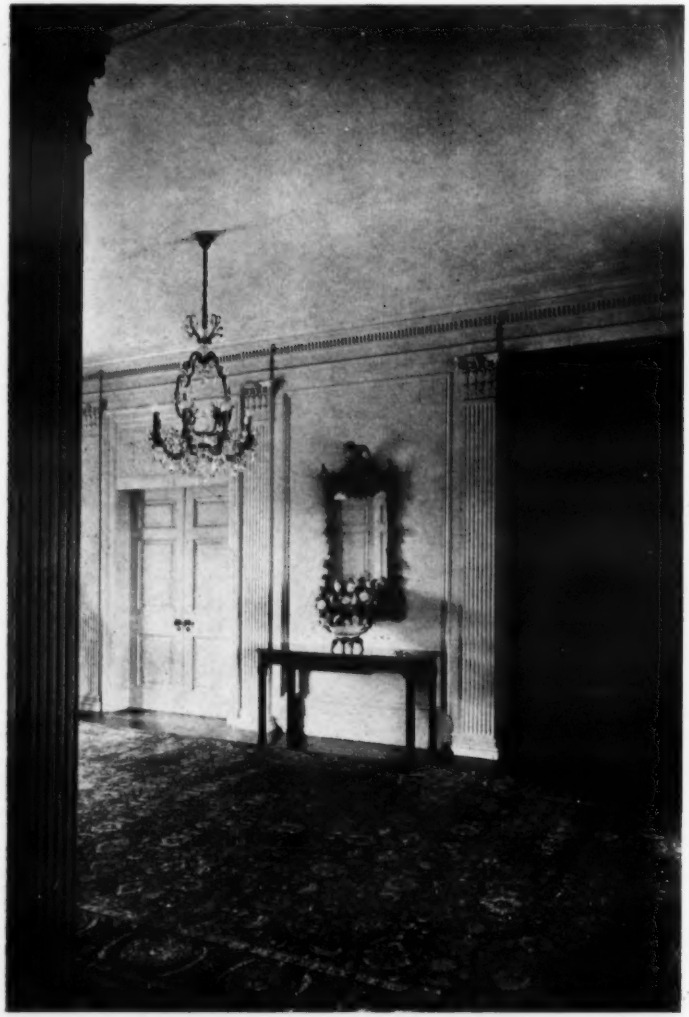

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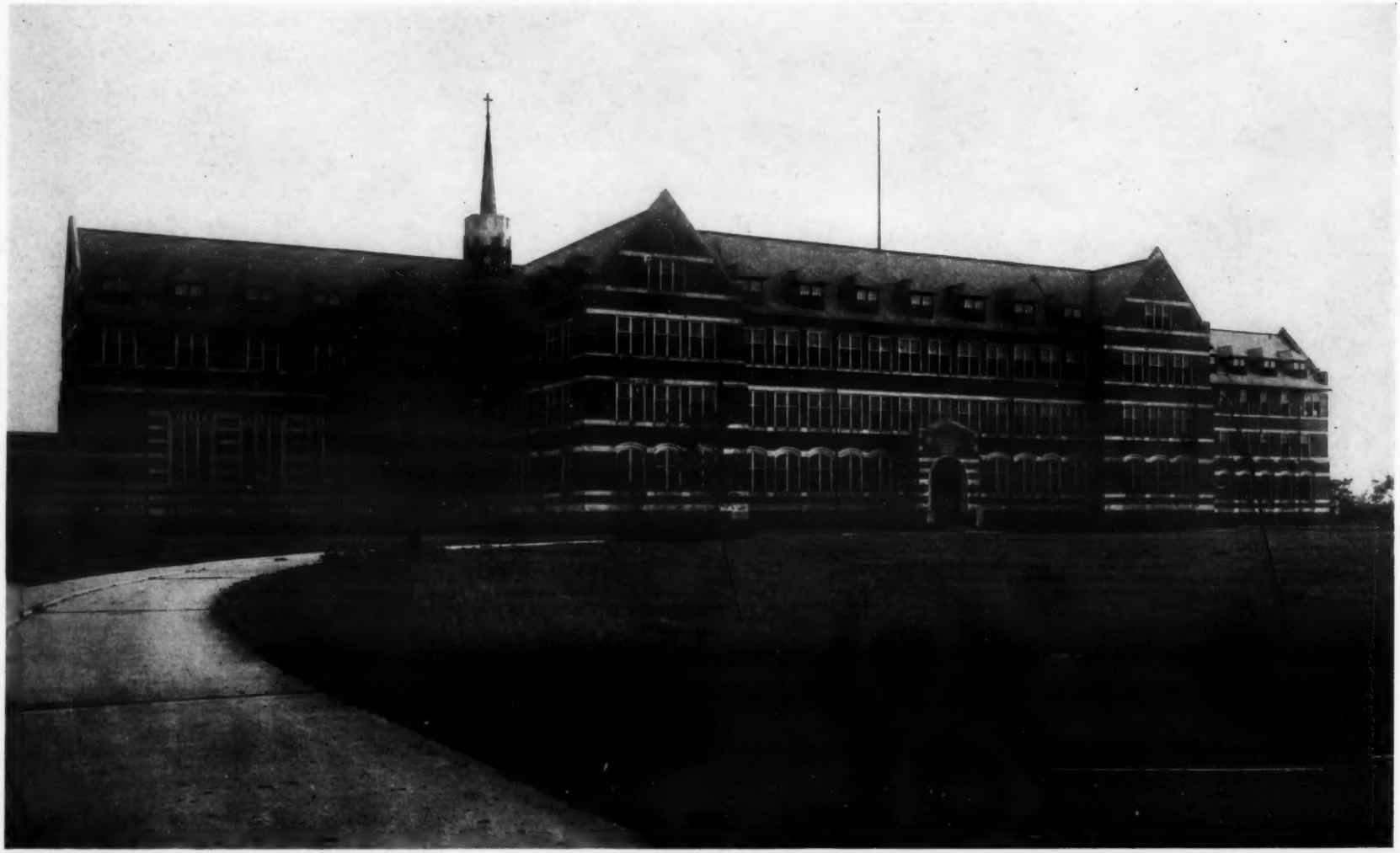

ST. FRANCIS HOME FOR ORPHAN BOYS, DETROIT, MICH.

ALBERT KAHN, ARCHITECT

ST. FRANCIS HOME FOR ORPHAN BOYS, DETROIT, MICH.

ALBERT KAHN, ARCHITECT

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DETAIL, EAST FACADE—WOMAN'S ART BUILDING, INDIANAPOLIS, IND.

CHARLES W. NICOL, ARCHITECT

XUM

MAIN ENTRANCE

ADMINISTRATION BUILDING, SERVICE MOTOR TRUCK CO., WABASH, IND.

CHARLES W. NICOL, ARCHITECT

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·EDITORIAL·COMMENT·

The Amateur Architect

THE appointment of Mr. Brangwyn, a well known artist, to design an art gallery in Japan has moved *The Architect* of London to a discussion of the effect on architectural practice of the activities of amateurs.

"Building a century ago" comments *The Architect,* "was not the complicated undertaking it has become today." Then matters of design were predominant and men of good birth and sound education often successfully influenced the design and plan of their own houses. With correctly established ideas, combined with the practical co-operation of competent builders, there were, a hundred years ago, erected in this country and in England buildings, many of which are now extant, that may be warmly commended for their architectural excellence. In fact, most of the examples of early American architecture, cleverly sketched by Mr. Eggers and illustrated in THE AMERICAN ARCHITECT, were undoubtedly designed and built under the superintendence of these amateur architects in co-operation with the extremely clever builder-architects of that period.

But, building then and now is vastly different. A man who today sets out on an important building operation,—and all building operations have become important,—who acts as his own architect, may be placed in the same class with the man who acts as his own lawyer,—he has a fool for a client.

States *The Architect*:—"Building operations are carried on through the agency of contractors and to make a definite building contract which accurately defines the architect's responsibilities, a mass of drawings is required."

Obviously no amateur can today supply such drawings, nor can he efficiently supervise their execution.

IN the technical and trade press outside of the field of architecture, it has, we regret to note, lately become a custom slightingly to refer to the value of the architect's services and to suggest the substitution of those of men trained in special work in the buildings that may be under contemplation.

A specific instance occurs in a recent issue of *The Modern Hospital.* This is over the signature of a superintendent of a large hospital building, who bluntly makes the statement that in the details of hospital planning, the services of an architect are not essential. A refutation of this erroneous idea as to the value of an architect's services is forcefully set forth in a communication from Mr. Richard E. Schmidt of Schmidt, Garden & Martin, architects, Chicago, and printed elsewhere in this issue.

It is unfortunate that such championing of the rights and dignities of the profession of architecture as may be undertaken should be confined solely to the unofficial architectural press. It was logical to assume that a governing body of the profession might take steps to refute these ill-considered allusions to the profession and it would seem that a very valuable opportunity is offered for the organization and active work of a newly formed committee on Public Information whose duties it would be to correct misleading statements as to architectural practice. We hailed with some satisfaction the appointment of such a committee several years ago, but we were misled by its name, for the public information appeared to be purely for members of the profession and not for that large body of the laity who are becoming more and more misinformed by unwise and ignorant criticisms as to the value of architect's services.

What Does the Modern Client Expect?

JUST what, exactly, is the modern business man coming to expect from his architect? In the Department of Legal Information, in this issue, Mr. Blake very thoroughly discusses the modern aspect of architectural practice, and brings out points that it will be valuable for architects to learn.

While architecture undoubtedly is an art, its development has made it necessary that architects should, as Mr. Blake states, be "business men, acquainted with both the complexities and the practicalities of modern business."

If the profession is to keep pace with the various elements that are so often encroaching on architectural practice, it will need very largely to revise the old conception of an architect's duties, and so thoroughly inform itself on these practicalities that it may efficiently render to clients,—the modern business men,—the services that are now generally expected. Mr. Blake very clearly points out the way that the architect may properly and safely function. His article should receive a thoughtful reading.

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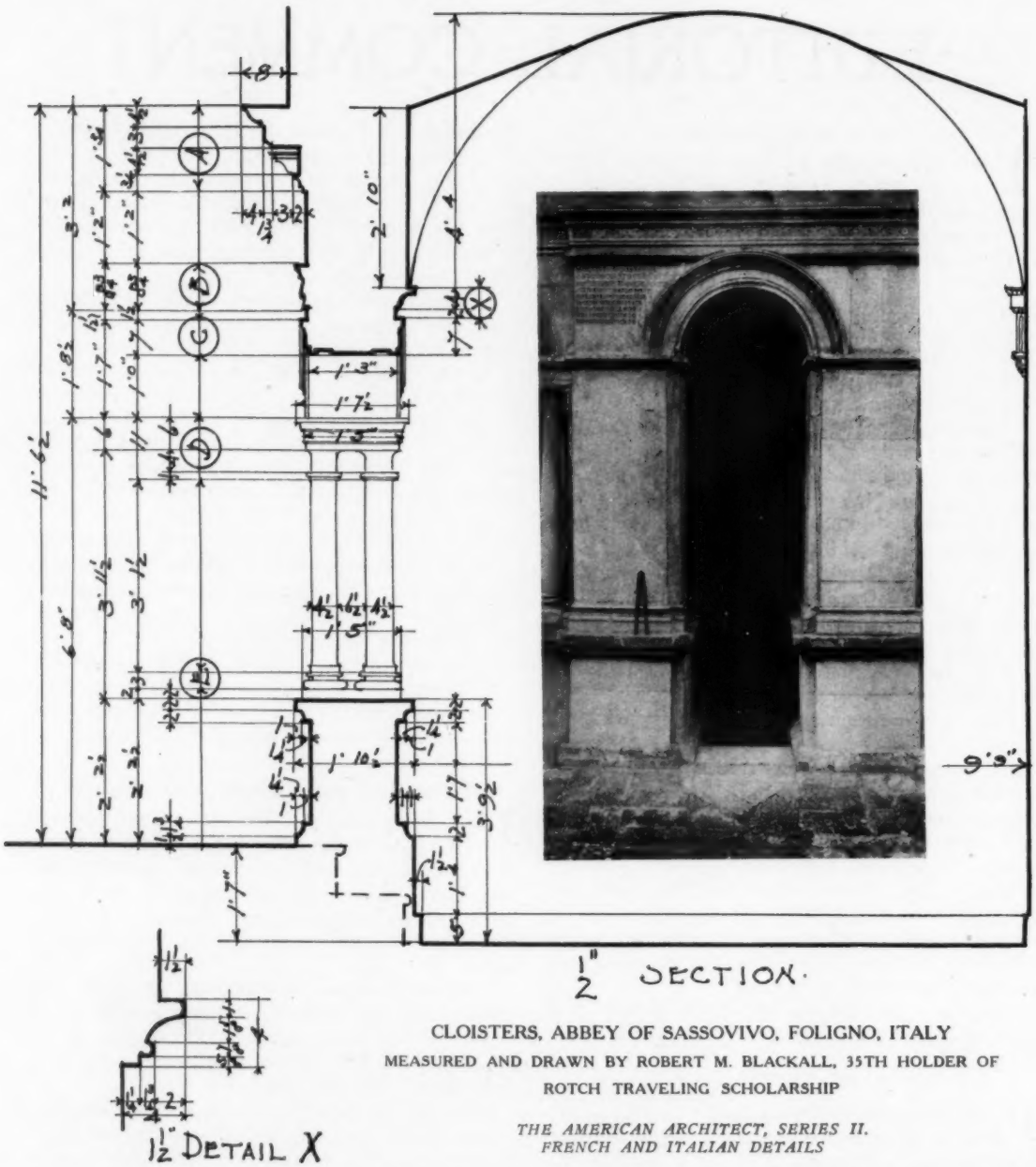


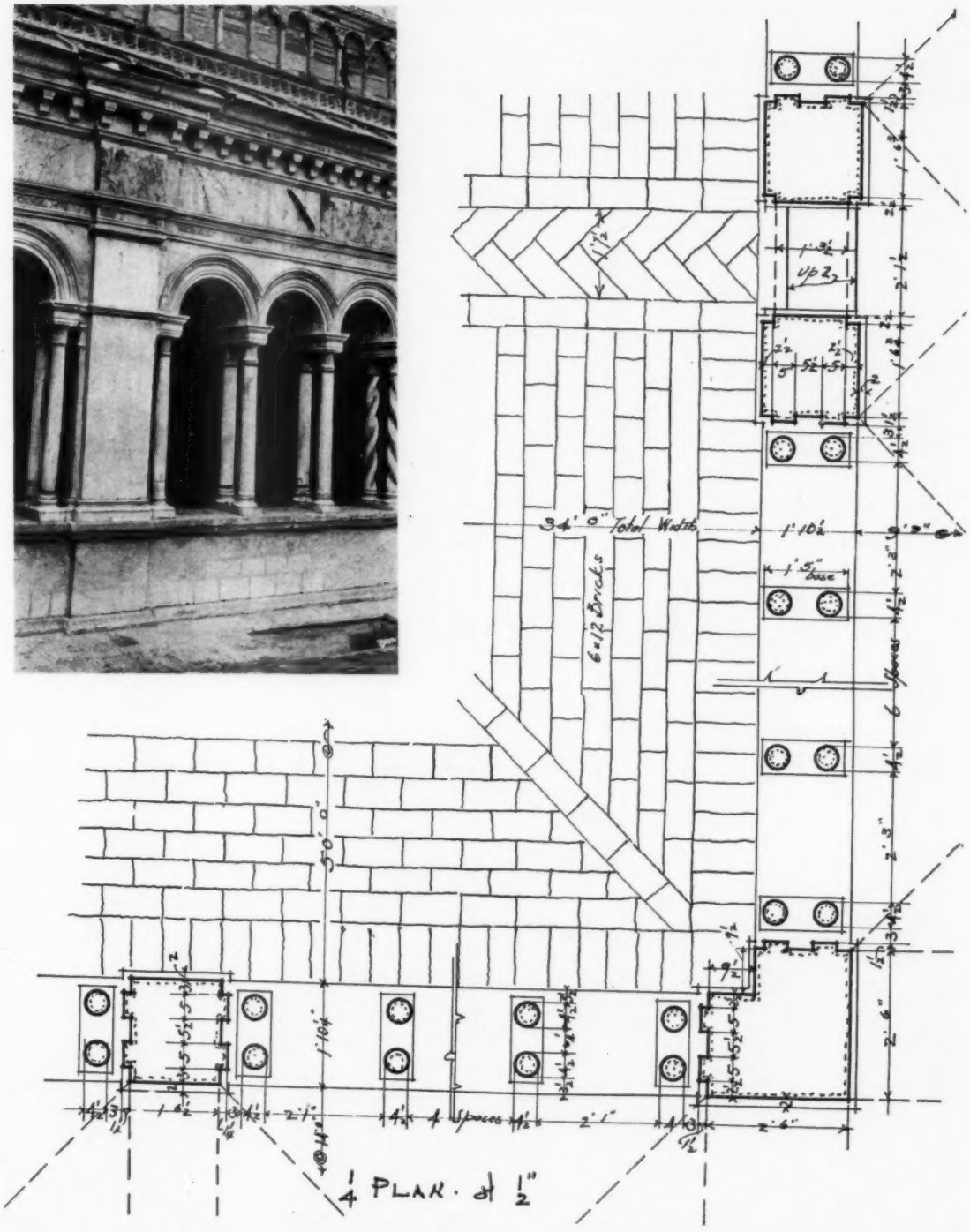
CLOISTERS, ABBEY OF SASSOVIVO, FOLIGNO, ITALY

MEASURED AND DRAWN BY ROBERT M. BLACKALL, 35TH HOLDER OF ROTCH TRAVELING SCHOLARSHIP

THE AMERICAN ARCHITECT, SERIES II.
FRENCH AND ITALIAN DETAILS

THE Benedictine Abbey of Sassovivo lies among the hills about one and one-half hours from Foligno. The monastery was founded by the Benedictine Monks in 1066 and in the fourteenth century it was at the height of its power, importance and wealth. It was suppressed by Innocent VIII. It causes a shock of surprise after climbing about the neglected and ruinous building used for farm stock to enter suddenly into the small cloister, perfect in every particular.

The refined beauty of the colonnade and the grace of the whole design at once remind the traveler of the cloister of St. John Lateran, Rome, upon which it is modeled. The arches rest on pairs of small columns. The capitals are bell shaped and the lines of the cornice are relieved by mosaics worked in the style of the cosmati. The cornice is a marvel of beauty. It is a series of simple mouldings and arcadings executed in yellow sandstone, terra cotta and delicately tinted marble. The simplicity of design, the air of refinement and proportion, the beauty of color and the subtle sense of harmony make of the quiet cloister a most perfect and lovely picture and one that will give pleasure to the architectural student. The cloisters were constructed in 1229.



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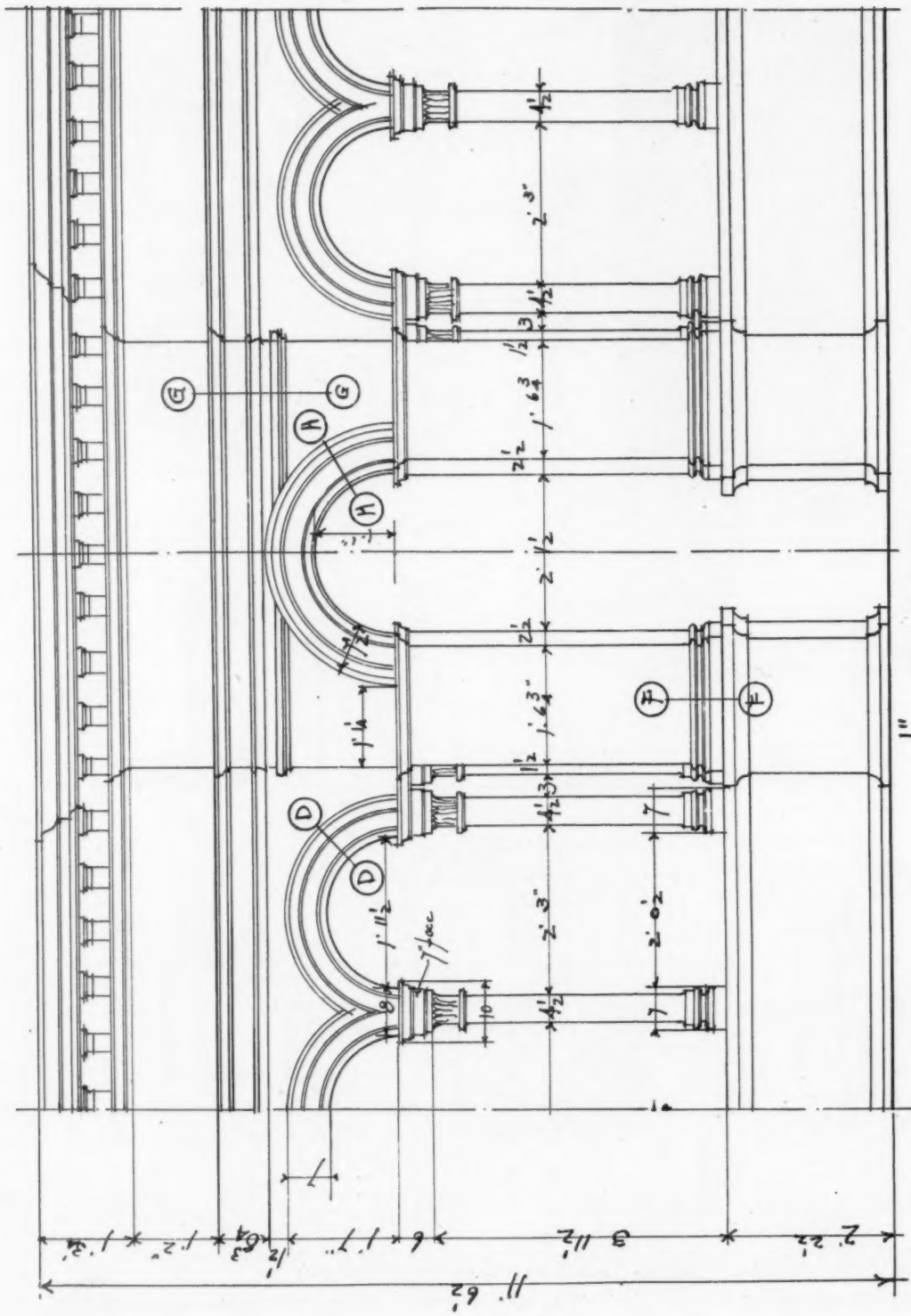

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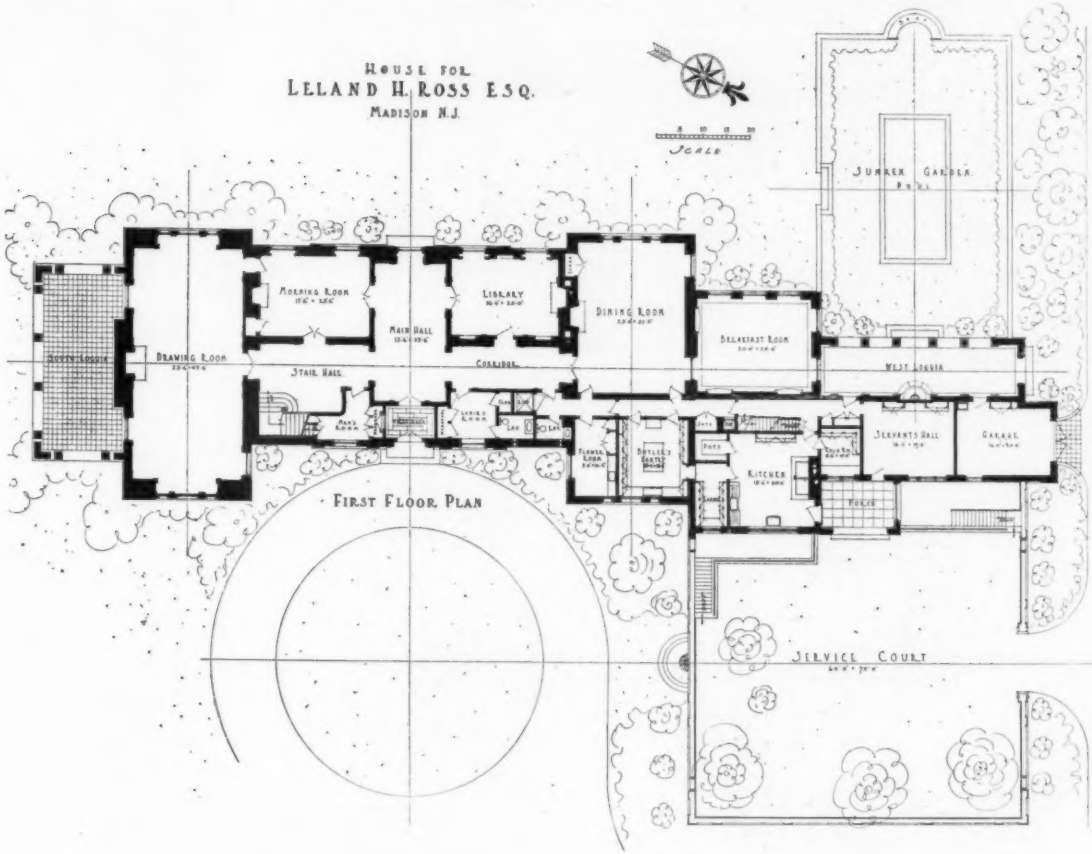

HOUSE OF LELAND H. ROSS, MADISON, N. J.

BEHR & SMITH, ARCHITECTS

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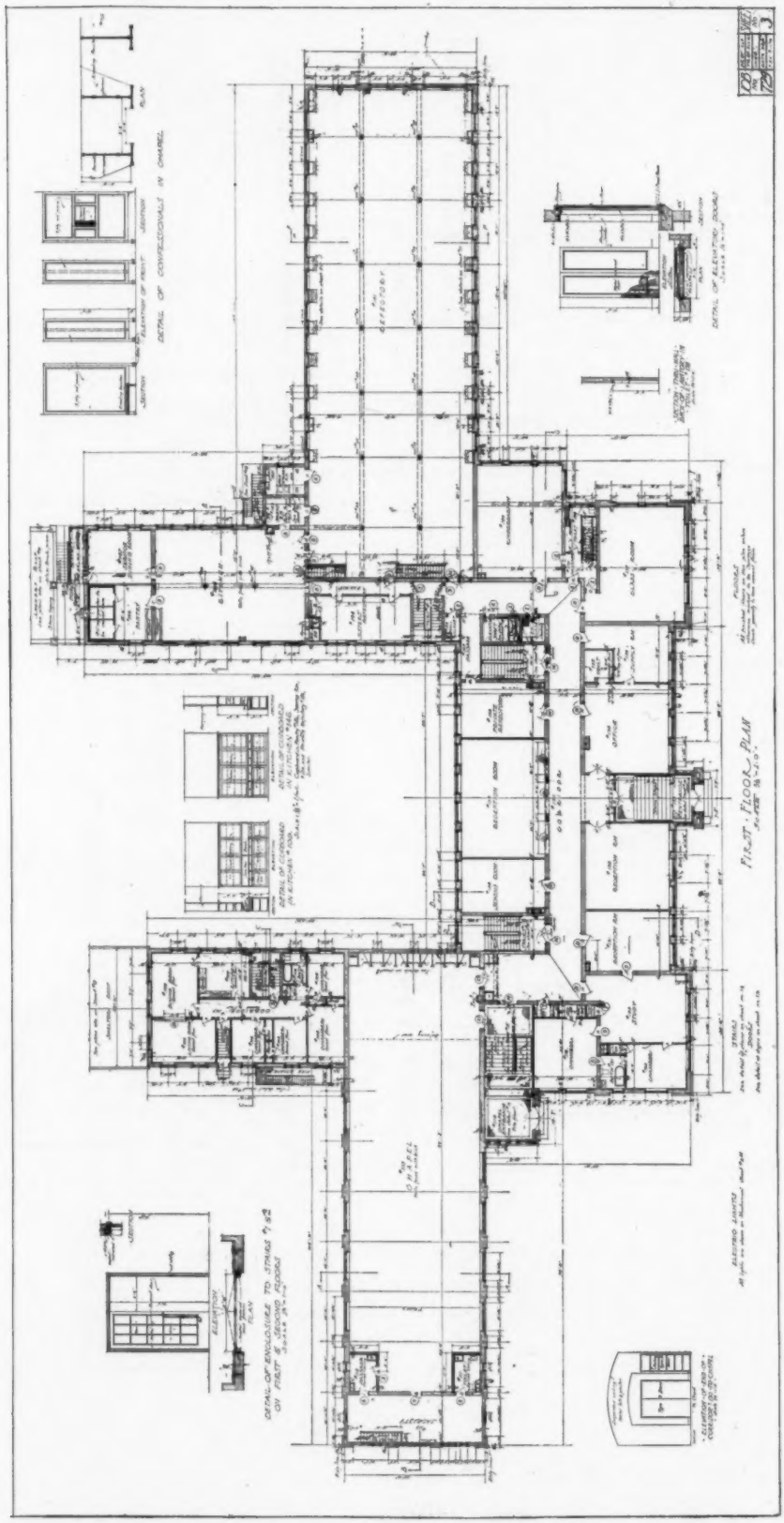

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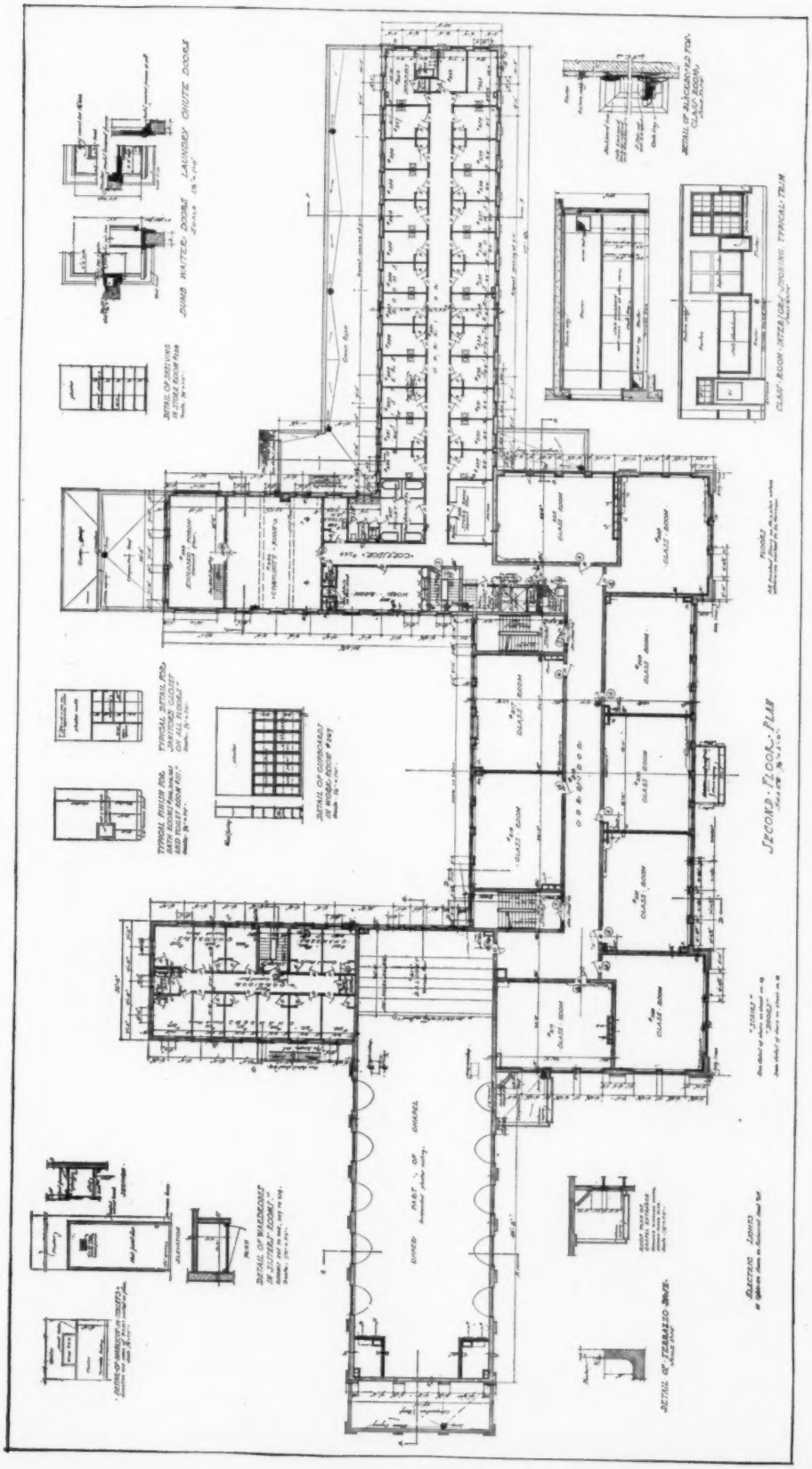
ALBERT KAHN, ARCHITECT



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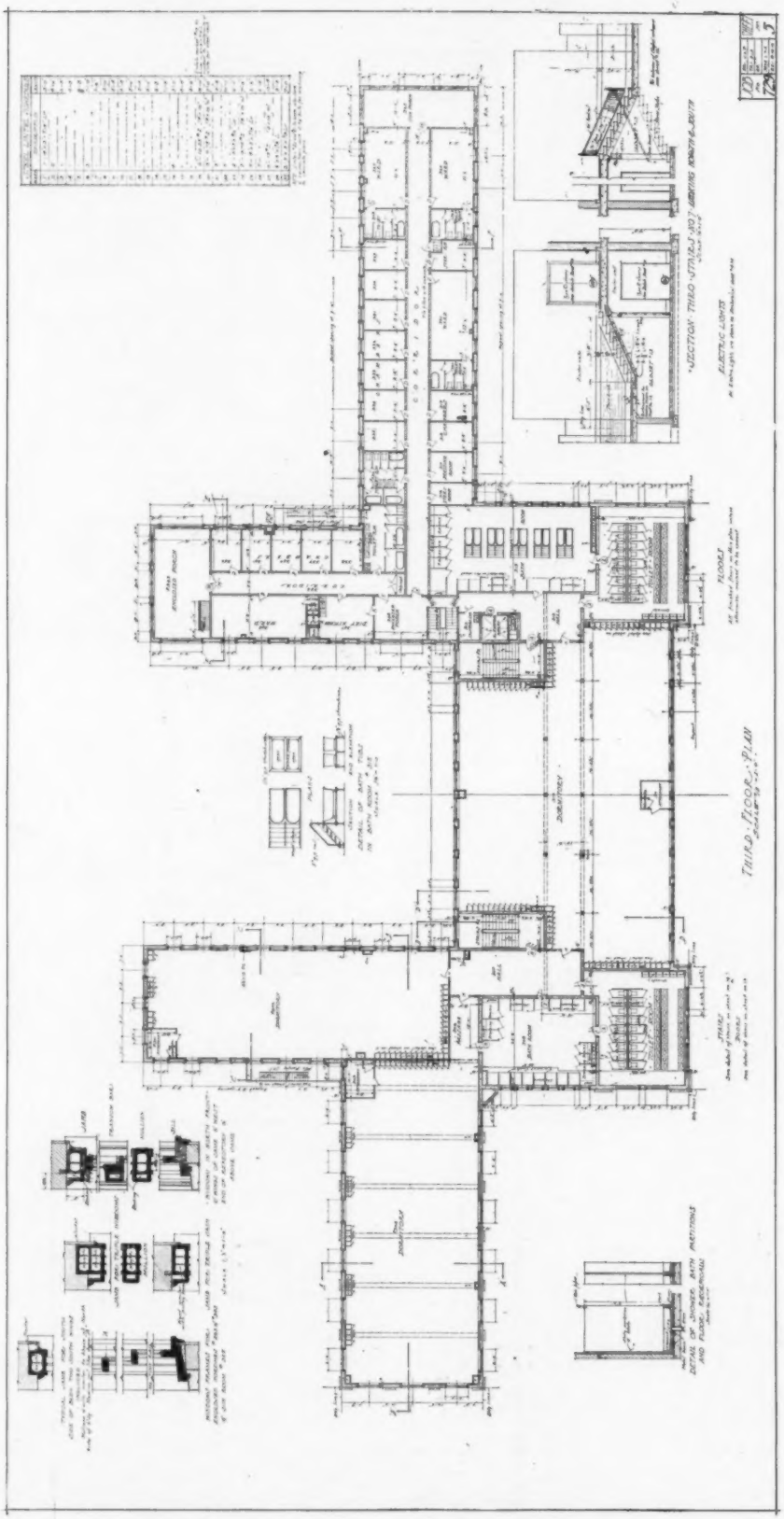

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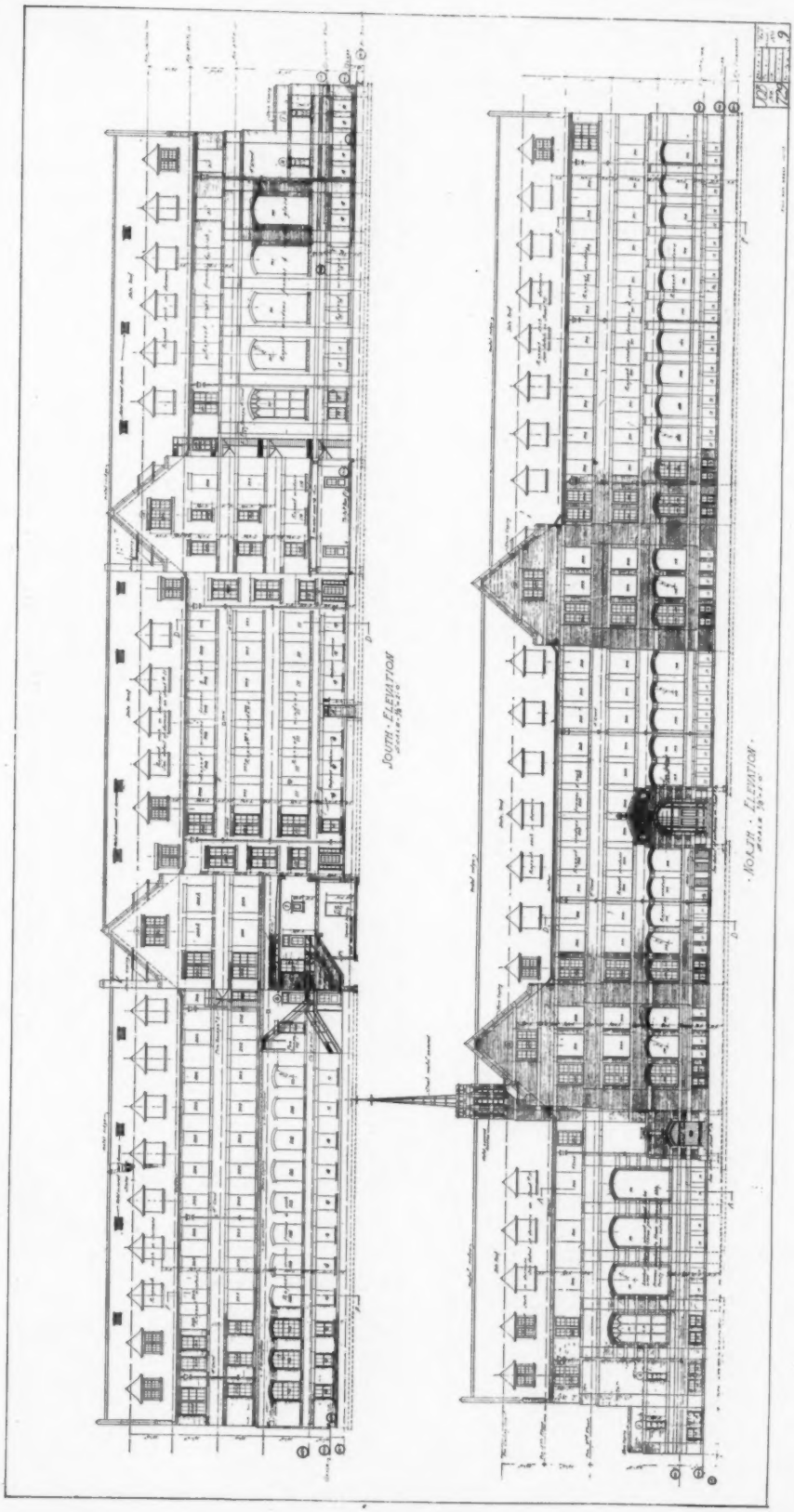

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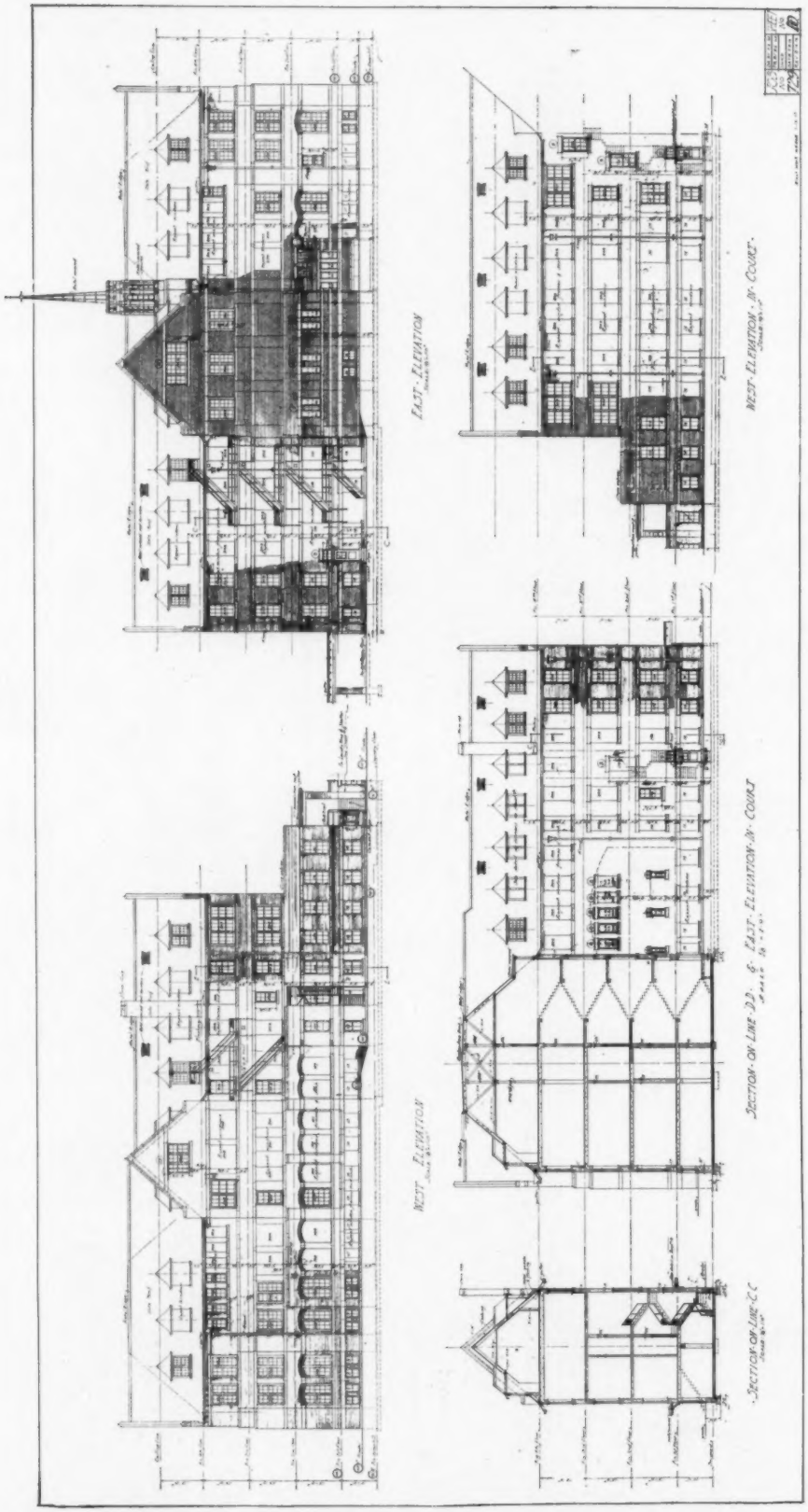

ST. FRANCIS HOME FOR ORPHAN BOYS, DETROIT, MICH.

ALBERT KAHN, ARCHITECT

LEGAL DEPARTMENT

Conducted by

CLINTON H. BLAKE, Jr., of the New York Bar

IN recent years, there has been a marked tendency for architects to go beyond the limits of the services which they are called upon to perform for their clients under the strict letter of their contract, and take upon themselves a greater responsibility in many ways than they are legally called upon to take. It has become necessary for the modern lawyer, dealing with important corporate matters and the like, to extend the scope of his knowledge and activities beyond the old-time conception of the office lawyer, as one who merely gave advice on technical questions of law and interpretations of statutes, and become in many respects a business man acquainted with both the complexities and the practicalities of modern business. There has been an almost exactly similar development in the architectural profession. The old conception of the architect as one who, in the seclusion of his office, prepares plans and then superintends the erection of a building, in accordance with the plans, and nothing more, has, under modern building and commercial conditions, given way to the idea of the present day architect, who must, in many cases and in repeated instances, go beyond these fundamental and narrower limits of his activities, and give much of his time to problems involved in the present day building operation, such as labor disputes, disputes between the contractor and the owner and the like, with which, technically, as architect, he is not primarily concerned.

It was only but the other day, that I was called in consultation by an architect in behalf of his principal, the owner, in a case involving a dispute between the general contractor and a labor union. The matter was one which concerned, strictly speaking, the owner and did not, except indirectly, concern the architect. The latter, however, was the one who took the initiative in bringing about the proper solution of the situation and who represented the owner in dealing with the problems presented. This architect was merely giving to his client the service which the modern business man is coming to expect from his architect.

It is a sound business policy which prompts the architect to go beyond the strict limits of his employment, in protecting his client, and voluntarily to act as the latter's representative in handling issues and disputes arising in the course of the building operation. The larger architectural offices are more and more coming to appreciate the value of such an extended service to their clients, as a business asset, aside from any questions of professional duty, and to place at the disposal of their clients facilities and service which it would have been impossible for an architect of an earlier generation to offer, even had it occurred to him that it was necessary or advisable to do so.

It is important, however, for the modern architect in giving this added service to his client, in acting as the buffer between the client and the contractor, the contractor and the sub-contractor, or the client and the trade union of materialman, as the case may be, to realize that there is a certain danger in the assumption of an authority beyond that which naturally follows his employment as architect. The mere employment of the architect to superintend the work endows him with a certain well-recognized authority. This authority, broadly speaking, is to see that the work is performed in accordance with the plans and with the specifications. So long as he acts strictly within the bounds of this authority, he is on safe ground. As soon, however, as he goes beyond it and undertakes to speak for the owner or represent the owner in decisions outside of the limits of the preparation of the plans and specifications and the superintendence of the work, he is entering a danger zone.

If the architect undertakes, in an emergency or in the absence of the owner or otherwise, to authorize, for instance, additional extras or changes in the plans and specifications or to agree to concessions to the contractor or the materialman or to induce the contractor to settle labor disputes on the basis of some assurance of consideration from the owner or of additional compensation for the work, he should, in such event, before acting, secure the definite authority of the owner to represent the latter and to act for him on the point in question. This authority would be, in law, known as a special agency, as distinguished from the general agency powers of the architect under the original terms of his employment.

It is entirely natural that an architect, engrossed in the matter at hand and without an understanding of the legal principles involved, should act time and again as he believes in the interests of the owner, but without having secured from the latter any grant of authority for the action which he takes. Only too often, I have had presented to me cases where the architect, with the best intent, has taken action in behalf of the owner which the latter disowns or of which, when future disagreements arise, he attempts to take advantage.

There is however, no mystic formula or technical legal red tape involved in securing the necessary grant of authority to support any step which

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the architect takes outside of his ordinary routine services. Any consent on the part of the owner or acquiescence by him in the action of the architect is sufficient to protect the latter in the course which he follows. Of course, the more definite this consent and acquiescence are, the safer the architect will be. It is preferable, accordingly, in every case where such a course is possible, for the architect to secure the written approval of the owner. This may be a written approval of a particular act proposed, or an approval including authority on many different points. Many contracts, by their terms, require any such special authority to be in writing. Where this is the case, the architect should be careful to have the authority placed in this form. Where this is not necessary and it is not practical, for one reason or another, to secure written approval of a particular step which the architect desires to take, verbal approval by the owner should be secured in any event. If possible, it should take such form, that there may be no ambiguity about it and no difficulty in proving the fact that it has been given, if necessity to do so arises.

In sketching these general points of warning, I would not be understood as deprecating in any way the modern tendency of the profession to assume these general and broader responsibilities. On the contrary, I believe that the assumption of them is in the interests of the architectural profession and of the owner alike, and is, in fact, rendered necessary by modern business and commercial conditions. The point is, that, recognizing that this is so, the architect nevertheless should be diligent to take such ordinary precautions as may be necessary to protect himself from complications arising from an excess of zeal on his part or from the taking by him of any step for which he has not received authority from his client.

If there be the slightest doubt of the right of the architect to speak for the owner on a given point or to order changes or extras or to perform any act which he proposes to perform, the only safe course for him to pursue is to secure that authority before acting. If he does this, he can feel assured that there will be no "come-back" in the future and that he will not be penalized for having extended his activities beyond the limits of the authority granted to him.

RECENT LEGAL DECISIONS

THE architects sued to recover for services in the preparation of plans for alterations to defendant's house. The defendant had abandoned the alterations and the architects declined to deliver the drawings to him, on the ground that they were following the rule of the American Institute that "drawings and specifications, as instruments of service, are the property of the architect." It was held, that while it might be true that where both parties knew of this rule and contracted in contemplation of it, the drawings would remain the property of the architect, yet, in the case in question, it appearing that the defendant was ignorant of the rule and that no such agreement had been made, the drawings belonged to him and the architects could not recover without delivering the drawings.

Hill v. Sheffield 117 *N. Y. Supp.* 99.

THE testimony of architects that it is a general custom that the plans shall remain the property of the architect is not sufficient to show a custom binding on the community generally, and does not affect the rights of the owner in the plans, unless it is shown that both parties knew of the custom and contracted in contemplation of it.

Gibbon v. Pease and Moffatt v. Scott.
Tilly v. Cook County, 103 *U. S.* 155.

AS between themselves, an architect and his client may agree that the architect shall remain the owner of the plans and specifications and that the client shall not use them again, without making proper payment therefor.

McCoy v. Grant, 174 *Northwest Reporter* (*Minn.*) 728.

AS between the architect and builder, a general custom has been recognized, to the effect that the builder has a right to have the plans in his possession and to use them while the building is in course of construction, although the plans are to remain the property of the architect.

Lumsford v. Dietrich, 86 *Alabama* 250.

WHERE an architect agrees to furnish all necessary plans and to perform the usual and customary services of an architect and to receive as payment a percentage of the cost of the building, including the settling of disputes, he cannot recover for revised drawings necessitated by changes in the plans, nor for extra compensation for acting as arbitrator between the owner and the contractor.

Osterling v. Bank, (*Pennsylvania*) 105 *Atlantic* 633.

A PROVISION in a contract, whereby the architect is appointed the arbitrator of such disputes as may arise between the parties, is as binding as, and probably more binding than, an ordinary submission of a dispute to arbitrators for the reason that such a provision becomes a part of the original consideration for the contract.

Water Co. v. Fidelity, etc., Co., (*Indiana*) 123 *N. E. Rep.* 703.

DEPARTMENT OF SPECIFICATIONS

IN the Department of Specifications in the last issue of *The American Architect* the subject discussed was "Demolition of Existing Buildings." The next sequential subject is "Excavation" which will be discussed from the standpoint of two assumptions.

The first of these assumptions is that the excavation work will be the subject of a separate contract, and the second assumption is that the excavation will occur in almost any kind of soil; whatever special notations may be required with respect to the different soils will be given so as to cover the various kinds of operations that must be specified.

Wherever excavation work is to be made the subject of a separate contract it is customary to include therein only the main excavation, leaving the incidental trimming of banks, excavation of trenches and pits for footings, piers, etc., and other finished work for inclusion in the foundation construction specifications.

This Department will not attempt to enter into a discussion of the geological elements of soils and a detailed study of the use of explosives in excavation work in soils that cannot be removed by steam shovel. The study of soils from a geological standpoint should be made by every specification writer and he will find that there are available several authoritative books on engineering geology that can be read with considerable profit. The specification writer cannot anticipate what difficulties he will encounter in specifications for excavations unless he is thoroughly versed in the important phases of engineering geology. It is not necessary that the specification writer be as thoroughly familiar with the detailed nature of soils as is required for the writing of a book on the subject of engineering geology, but he most certainly should know the engineering description of rock, shale, clay and ordinary earth so that he can specify their removal intelligently.

Regarding the use of explosives, it is not within the province of this Department to discuss the use of explosives in text book fashion and the reader must bear in mind that the purpose of these discussions is to elucidate in some degree of clarity the methods of writing specifications that will result in a successful conclusion of the work, and throughout these articles it will be necessary to disregard some detailed studies of various operations with which the specification writer should be acquainted. As these points occur, efforts will be made to make clear just what the intention of this Department is with respect to the technical description and understanding of methods or materials that are necessarily precedent to the intelligent specification of desired results. It seems proper to emphasize these points at this time in order that the reader will not assume that attempts are being made to gloss over the lack of details that might be expected. Many pages could be written on the use of explosives in excavation work but such a discussion would be burdensome to our main subject, which is Specifications.

BEFORE writing specifications for excavation work it will be necessary to know the geological nature of the soil, whether or not there is water present that may interfere with open excavation without coffers or other water repelling devices, and how excavation work will affect adjoining street and walk pavements or buildings.

This Department in the issue of October 12 presented suggestions with respect to investigations that should be made by a competent engineer before the detailed designing of the building is commenced and if the suggestions given therein are followed, definite information relative to these phases of the work should be at hand.

As will be the case in all specifications, the specifications for this section, which will be numbered two in our series, should have as its first paragraph a reference to the "GENERAL CONDITIONS OF CONTRACT."

The second paragraph should be entitled "SCOPE OF CONTRACT" and should recite in detail the conditions obtaining and the work that is to be accomplished. The questions that must be determined by a reading of this paragraph are:

a—Extent of the work

b—The kind of soil that is to be expected and whether this information is based on the results shown by test borings or whether assumptions are based on known conditions obtaining in the immediate vicinity.

c—The disposal of all excavated material. If any material is to be retained on the work for back-filling or finished grading, that fact must be noted.

After reading this paragraph the estimator will have presented to him the fundamental bases that will govern the cost of the work.

If the site has been occupied by a building that has had excavated basement spaces it will be necessary to call attention to the existence of such spaces, and if the area and depth of these spaces are not indicated on a survey sheet that is a part of the drawings these dimensions should be given, approximately, in the specifications.

If it is known that the ground water level is pretty close to the existing grade level, this fact must be mentioned, as the existence or non-existence of ground water is a vital factor in the cost of the work.

It is quite often proper to require that con-

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tractors who propose to submit estimates under the specification should visit the site and become familiar with conditions as they may be presented to them by visual examination, but this requirement sometimes is superfluous, especially where those who are to submit estimates are not residents in the vicinity of the construction work and very probably would not make a special trip to the site unless the specifications explicitly stated that known existing conditions involved possibilities of such a great expense with respect to the accomplishment of the work that it would be advisable for all estimators to know exactly what conditions are.

We will then add paragraphs numbered three, four and five which will be respectively: "EXTENT OF EXISTING EXCAVATED SPACES" "GROUND WATER LEVEL," and "EXAMINATION OF SITE."

The sixth paragraph will be captioned "EXCAVATION" and should recite in detail the actual work of excavation as in writing this paragraph consideration must be given to the amount of soil that is to be removed.

In general the soils may be divided into the following classifications:

a—rock
b—shale
c—clay
d—earth
e—sand

At a casual glance it does not seem possible that there would be any misunderstanding of the nature of rock. This subject, however, has been given very earnest attention in some legal controversies and misinformation or ignorance of the nature of rock at times has caused a great deal of grief to the architect. The same comments may be made with respect to shale and it is often rather difficult to determine whether shale is rock or rock is shale. One would expect that rock could not be removed by the steam shovel or a drag line and most certainly not by the hand pick and shovel. Likewise, with respect to shale, persons who have lived in districts where shale is extremely hard and might possibly be named rock under strict geological description, may not understand that there are some shales that can be removed by the steam shovel and in some instances by the hand pick and shovel. With respect to clay, earth or sand there usually do not enter questions that are difficult of solution unless the clay is mixed with rock or shale or unless in either clay or earth there are pockets or strata of quicksand. If the specifications are to be written on an equitable basis—that is, equitable both for the contractor and the owner—and it seems possible that different kinds of soil will be encountered, separate prices should be requested on the excavation of each class of material.

LET us assume that the site is covered with about 12″ of earth or ordinary soil under which there is an admixture of earth and sand three feet thick, followed by a gravel strata three feet thick, after which we find blue or yellow clay with perhaps some sand and gravel mixed with it for several additional feet, under which lies a thin strata of shale which finally turns into rock, and we will have conditions that frequently are encountered. In one corner of such a site it is possible that a pocket of quicksand will be found, with consequent water conditions that must be contended with. Let us suppose that separate figures are asked for excavation of shale or rock and for all materials other than shale or rock there would be three different prices governing payment for the work.

It may be that large boulders will be found mixed into the clay, the size of which will not preclude their being removed by the steam shovel or by the ordinary hand excavation methods. If this is so and there is a price governing the excavation of rock, an impecunious contractor might make a claim for the rock excavation price for the removal of such clay on the assertions that boulders are rock. Furthermore, he might contend that shale is rock and the architect probably would find it impossible successfully to combat this contention. Therefore, when writing specifications for excavation work where it is not known definitely whether shale or rock will be encountered but where there is a belief that these materials are present, there should be a definition of these materials. One definition that has proved successful in such cases is as follows:

> "All material that can be removed by the steam shovel, drag line or hand pick and shovel, shall be classed as ordinary earth, and all material that can be removed only by the use of explosives or by wedges in drilled holes shall be classed as shale or rock."

If this distinction is kept in mind, it will give sufficient warning to the specification writer and will act as a suggestion as to how the specification may be written.

An acquaintance with the various types of excavation machinery available is quite desirable in order that the specification writer will be able to anticipate, to a certain extent, the methods that the contractor will pursue. In small operations involving very low yardage of material it is not practical to use a steam shovel, but the high cost of hand labor is bringing the use of the steam shovel into excavations for ordinary buildings to a much greater degree as the years pass. Steam shovels will be able to remove certain classes of shales that could not be removed by the hand pick or shovel and if such a shale is known to exist, it

should not be classed with rock with respect to the use of explosives or wedges for its removal.

AS we have assumed that the excavation work will not include trimming of banks, etc., it will be understood that the natural angle of repose of the soils will not be disturbed unless sheet piling is to be placed by the excavation contractor to maintain the surface of surrounding pavements or properties in their original position. The removal of ground water, if the excavation is carried below the ordinary ground water line, may introduce complications that would result in damage to adjoining properties and unusual expense to the contractor and, of course, the owner. Extreme care must be given the specifications for sheet piling which properly should be made the subject of the seventh paragraph. It is usually adequate to require that the banks be left so that the surrounding soil will remain undisturbed and if there is any possible chance that heavy rains will erode the banks, plank protection should be required so that the falling water will be deflected into the floor of the excavation so that it may seep away or that it may be removed by mechanical means.

If there is an adjoining building, the foundations of which do not go down as deep as the excavation work is to go, suitable temporary shoring must be provided—if it has not been provided before by other contractors—so that such adjoining building will be kept in a stabile condition until the foundation contractor can provide his shores. If such conditions exist it is advisable to keep the banks a sufficient distance away from the footings so that the inclination of the bank is sufficient to provide ample support for existing foundations. This will be included in paragraph eight.

Inasmuch as the purpose of excavation under this specification is to remove the greater amount of soil at a minimum of cost, leaving the more expensive trimming and trench excavation for other contractors, the excavation contractor should not be permitted to remove the soil that should remain to provide natural support for surrounding structures or public improvements until adequate temporary support can be given them by a contractor skilled in the placing of such devices.

If quicksand is encountered certain devices must be resorted to, but ordinarily if the specifications mention that quicksand pockets or strata may be expected, the ingenuity of the contractor must be depended upon to conduct the work in a proper and acceptable manner. He is intensely interested in the proper prosecution of his part of the work in order that it may be most economically accomplished and it is not advisable to lay down requirements of too exact a nature that may not actually be necessary in the work.

The ninth paragraph should require that trees that are to be saved, existing walks or road pavements that are to be left in place, curbs, lawns, shrubbery or such items that are to remain, should be adequately protected by boards or planks or some sort of device that will not become displaced during the excavation work. It is not possible to enter into a detailed discussion of these protective precautions without having definite conditions in mind, and conditions may vary so much that the ingenuity of the specification writer must be depended upon to take care of each circumstance as it may exist.

We have then the following outline for the excavation work:

I. General Conditions
   a. A paragraph referring the reader to the General Conditions that will be made a part of the Contract and which should be read by all bidders

II. Scope of Contract
   a. Extent of the work
   b. Kind of soil and degree of accuracy of knowledge thereof
   c. Disposal of excavated material
   d. Possibility of shoring and sheet piling

III. Extent of Existing Excavations
   a. Describe existing excavated spaces
   b. If old foundations and footings are left by wrecker, state so
   c. If old first floor construction has been left in place to brace old foundation walls, state so
   d. State what is to be done with old water or sewage conduits or similar services if unearthed and ready for use

IV. Ground Water Level
   a. State depth below a certain established grade and whether this is definitely known or is only approximately estimated
   b. Disposal of seepage of ground water. This may be covered under subdivision No. Six

V. Examination of Site
   a. Caution bidders of necessity for making examination before submitting estimates in order that foreseen expenses may be included. But do not assume that unforeseen difficulties should be included

VI. Excavation
   a. Rock
      1. Blasting
      2. Precautions to be exercised during blasting operations
         a. Matresses
         b. Other protective devices to prevent flying material
         c. Storage of explosives

Excavation (Continued).

b. Shale
   1. Same precautions as above for rock if blasting is required
   2. If Shale can be removed by wedges in drilled holes or by steam shovel of a certain power, state so
c. Clay
d. Sand
   1. Dry
   2. Quick
e. Gravel
f. Loam or common dirt
g. Disposal of water in excavations

VII. Sheet Piling
   a. State purposes that are to be served
   b. Give requirements as to nature of piling probably required and how bracing is to be accomplished
   c. Requirements for quicksand
   d. Protection of banks against erosion

VIII. Shoring of Adjoining Structures
   a. State conditions and give requirements
   b. Notices to owners of adjoining properties

IX. Protection of Trees, Pavements, etc.
   a. Describe conditions and state requirements as to preservations.

STAIR HALL

HOUSE OF LELAND H. ROSS, MADISON, N. J.

BEHR & SMITH, ARCHITECTS

(For further illustration of this house see plate section)

DEPARTMENT OF ARCHITECTURAL ENGINEERING

THE DESIGN OF LIGHT WEIGHT FLOORS OF CONCRETE

By WM. H. GRAVELL, M. Am. Soc. C. E.*

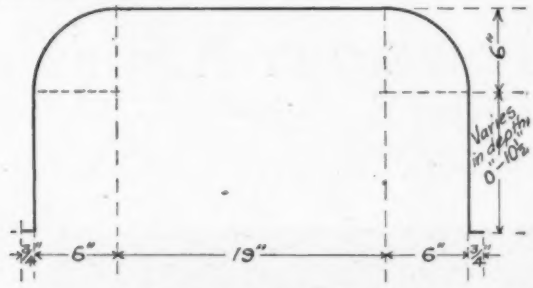
Webb Terminal Warehouse, Philadelphia, Pa., Wm. H. Gravell, Engineer. Unplastered ceilings, ribbed slab floors

THE late Ernest Ransome, one of the earlier pioneers in reinforced concrete construction, developed a light floor of ribbed members and published formulas to make the work of designers easy. In his day, however, all forms were made of wood and the expense of making and stripping them led to this type of floor being abandoned in favor of the combination concrete rib and hollow tile floor. This bit of history is introduced to show that the principle of the ribbed floor is neither new nor patentable and that difficulties with forms were the cause of its being forgotten for a time.

For ordinary spans and loads, a plain slab was often cheaper than a ribbed slab but the weight was a drawback and the use of the hollow tile fillers between ribs of concrete effected a tremendous saving in weight, the benefits being felt in sup-

*Of McClellan & Campion, Engineers, Philadelphia, Pa.

porting beams, girders, columns and foundations. Ordinary tile, being 12 in. wide, fixed the distance between ribs. Experiments with two tile side by side were not always successful although many slabs were built in this way with ribs 24 in. apart. One result, however, was the development of a decided sentiment in favor of a flat ceiling, the combination rib and tile slab affording a fine surface for plastering.

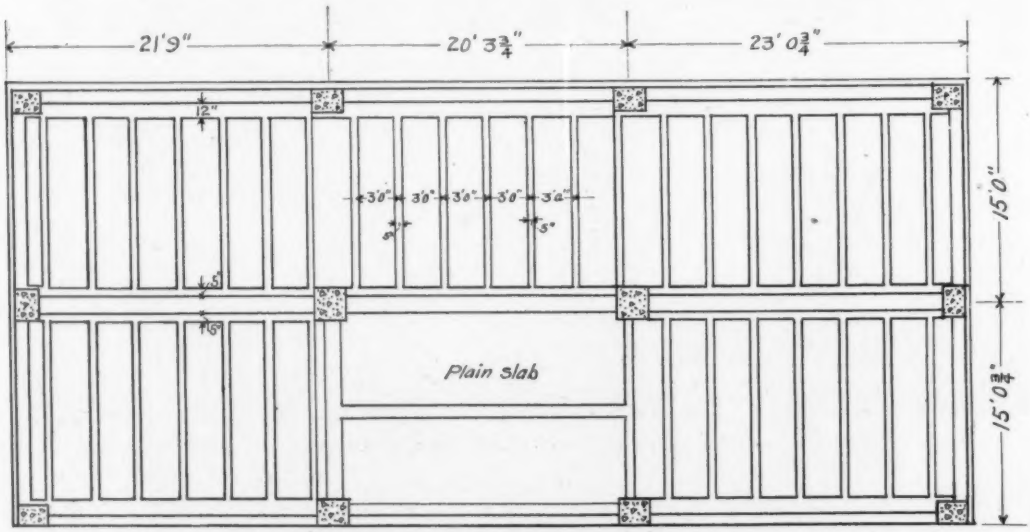


One form of metal centers. Other makes have sloping sides, with an angle of about seven degrees from the vertical

A few years ago a new metal center was introduced and several companies now make them so that contractors may buy or rent them and the ribbed floor is coming back. For those who prefer the flat ceiling a type of center may be used which is left in place and metal lath attached to the underside of the ribs for the plaster. It is possible, however, to use smooth forms which may be taken out, the metal lath for the ceiling being attached to wires projecting from the ribs. Smooth forms have the advantage over forms of mesh in the possibility of their being reused.

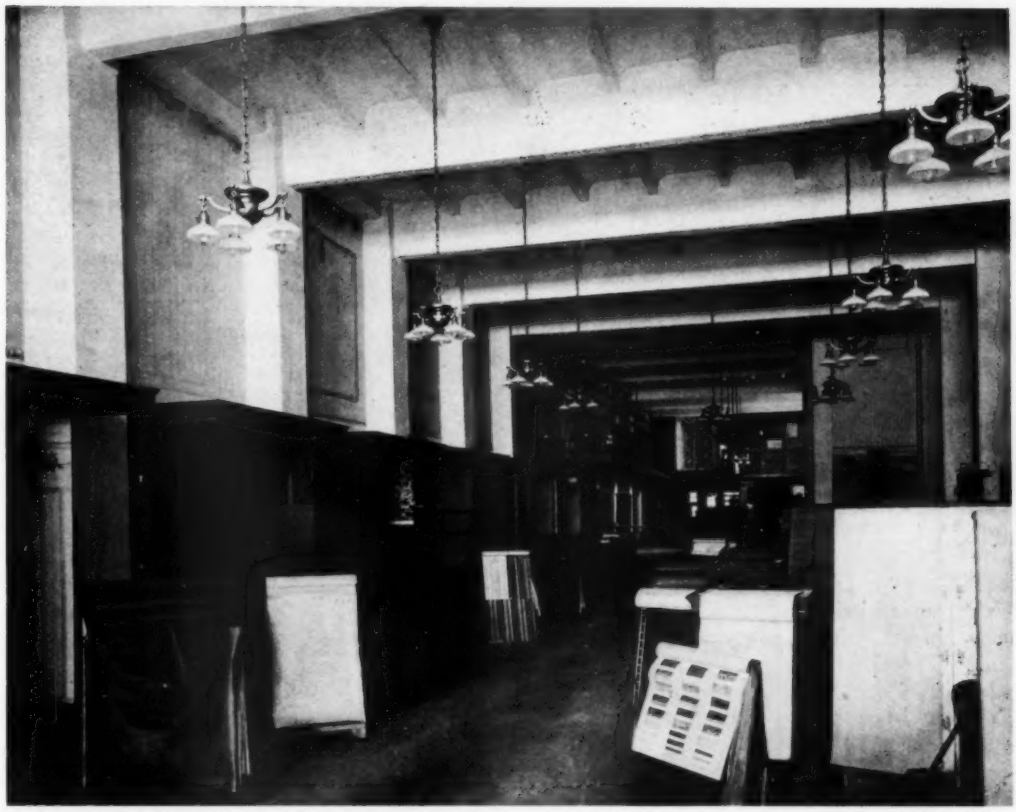
In the Otis Building, Philadelphia, erected in 1915, all the slabs were of the ribbed type, metal centers being used; and the addition completed during the present year contains the same type of slab. They are practically the same as used by the writer in 1910 for the Webb Terminal, Philadelphia. In the designs prepared in our office for two large dormitories for Princeton University ribbed slabs are provided. The accompanying photographs show that a properly constructed slab with exposed ribs is rather pleasing in appearance. The slab is designed exactly like any reinforced concrete slab, the only unique feature being the use of standardized metal centers.

The centers are usually made of No. 12 iron in sheets 60 in. wide bent as shown in the accompanying figure. The most convenient lengths are 5 ft., 8 ft. and 10 ft. They lap longitudinally and telescope so that depths may be varied from 6 in. to 15 in. and ribs may have any bottom width greater than 4 in. The ordinary bottom width of it is 5 in. giving a spacing of three feet. The ends are filled with wood. A slab thickness of 2½ in. is sufficient for most loads met with. A 2 in. plank 5 in. wide, properly shored, is used as a rib bottom form and left in place until the concrete is fully set. The metal center can readily be removed in warm weather in four days and, if properly handled, can be used in indefinite number of times. Those in the Otis Building Addition had been, it is learned, used eleven times previously.



Typical floor—2nd to 12th—Otis Building Addition, Philadelphia, Pa., McClellan & Campion, Engineers. Showing arrangement of ribs in floor slabs

The table of properties here presented is based on ribs 5 in. wide on 36 in. centers; maximum compressive fibre stress in concrete 650 lbs. per sq. in., tensile stress in the steel 16,000 lbs. per sq.



Showroom of Asam Brothers, Philadelphia, Pa., Wm. Steele & Sons Co., Architects. Ribbed Floor Slab with Plastered Ceiling

Metal centers in place. End fillers are made of wood. Flanges of T beams may occasionally be wider than required for strength in order to shorten spans of small ribs when shear is excessive

Maximum Properties of Metal Center Slabs

UNDER ECONOMIC CONDITIONS

Slab ins.	Conc. cu. ft.	Wt. lbs.	*L.* *ft.*	*jd.* *ins.*	*T=C* *lbs.*	*As* *sq. in.*	*V* *lbs.*	*M* *in.-lb.*
6" & 2½	.94	135	15	6.57	32,700	2.05	3,950	215,000
8 & "	1.02	145	18	8.32	39,000	2.45	5,000	325,000
10 & "	1.08	155	21	9.85	44,100	2.75	5,920	408,000
12 & "	1.15	165	24	11.40	47,500	2.95	6,850	540,000
14 & "	1.22	175	27	12.90	51,200	3.20	7,750	660,000
15 & "	1.26	180	30	13.60	52,700	3.30	8,160	718 000

in., $n=15$ and shear 120 lbs. per sq. in. The steel area given is for the maximum resisting moment, but it may be proportioned to the exact bending moment if desired whenever the bending moment falls between the resisting moments in the last column. The proper steel area is found by dividing the bending moment by the product of Jd and the steel fibre stress.

The simplicity of the wooden supports for metal centers is one of the cost reducing elements

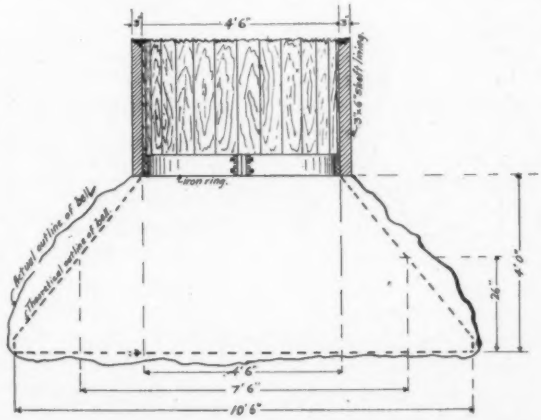
Experience in our office shows a 20 per cent. difference in cost in favor of the exposed rib, or joist, slab when compared with combination rib and clay tile slabs. This is in the slab only and the saving in weight is carried to beams, girders, columns and footings. The smooth centers are readily taken out and make a very decent ceiling for an unplastered job.

Metal centers in place for floor of Otis Building. Reinforcement supported on metal spacers to insure depth and spacing. Conduits for electric wires are embedded in the slab

THE DESIGN OF CONCRETE PIERS IN CLAY

THE design of foundations in clay is undertaken frequently without proper study. In such material the problem is to obtain sufficient bearing area. It is solved by assuming a certain allowable soil pressure per square foot, based on tests of the material on the site or, more frequently, based on personal judgment. The depth of the excavations usually plays a too important part and basement space is sacrificed; difficulties with adjoining owners not infrequently being encountered.

The use of columns instead of bearing walls results in many cases in the substitution of isolated square footings for wall footings but the area is still governed by the bearing capacity of the clay sub-soil. The sinking of shafts often reveals seams, or a seam, of hard material at a depth considerably lower than any which may be required for a basement and of a nature that will materially reduce the bearing area required for the load to be carried. A comparatively slender pier may be used by excavating a well and filling it with concrete. With this type of foundation it is possible to put in a deeper basement if required at any time in the future and the question of encroachment upon the property of adjoining owners does not arise. Considerations such as the above led to the use of "cylinder piers," in India for bridge foundations many generations ago. Cylinder piers were wells sunk by the open caisson method, the caisson being forced down by the weight of a thick masonry wall built up at a rate to correspond with the rate of sinking. When the metal shod ring on which the wall rested finally reached the pre-determined depth the interior was filled with concrete.



The shape of the "Bell" at the lower end of concrete pier sunk in clay by open caisson method

The use of a modified method came in with the skyscraper and it has received the name of "Chicago Caisson Foundation," because the first application is credited to Chicago. In that city rock is seldom found at a depth less than 90 feet and the upper layers of clay are quite soft. The earlier steel frame buildings were erected on spread foundations, sometimes, but not always, resting on piles. The sinking of concrete piers to rock was a natural development. The construction of a network of underground tunnels for a telephone company, which developed into an important freight carrying system is said to have caused streets to sink and buildings to settle because of the drainage of the sub-soil, so that today in the main business district it is the rule to found all buildings on concrete piers.

They are like all foundations in that, although a highly important part of the structure, there is a strong desire on the part of owners to spend on them no more money than is believed to be positively necessary, for they are buried in the earth out of sight. Not all go to bed rock, the usual depth being that which it is believed will carry the footing below future subways or sewers, the construction of which may result in draining the clay sub-soil and thus cause settlement of heavily loaded areas. Such piers are used today wherever modern frame structures are erected on an area covered with a clay sub-soil of considerable depth. The description, in the August 17 issue of THE AMERICAN ARCHITECT, of the piers on the site of the old Hotel Pontchartrain in Detroit led a reader to ask how such piers are designed, hence this article.

Assume that a column carries a load of 600,000 pounds and the pier must go to a depth of 90 feet below the basement floor to a layer of hard dry clay. Several layers of suitable clay were encountered in the exploratory borings but not at depths which insure against possible future disturbance. The first thing to determine is the diameter of the pier, a simple matter, for the smallest well in which men can excavate will have a diameter of four feet. Assuming a working stress on the concrete of 200 lbs. per sq. in., a pier 17 inches in diameter will carry the load, so it is evident that for a diameter of four feet a lean concrete may be used. It should be deposited fairly dry as the compression it receives will drive out much moisture and this will rob it of cement. If much water is encountered in sinking the shaft there should be less water in the concrete for it will ultimately receive a great deal by absorption. When the load is considerable a richer concrete is used and when the

wooden lining is left in the shaft the concrete is often wet enough to flow freely. Notwithstanding the theoretically sufficient low strength a concrete leaner than 1-2-4 is seldom employed.

Tests have shown that bending phenomena are not manifest on concrete columns in which the length is less than 30 diameters so another criterion may be applied to the case under consideration by assuming a diameter not exceeding one-twentieth of the depth. This fixes the least diameter for a 90 foot pier at 4 ft. 6 in., and this diameter will be used. The shaft of concrete will weigh 214,650 pounds, the concrete being assumed to weigh 150 lb. per cubic foot, a reasonable assumption when we consider the compression to which it will be subjected before it receives a final set.

The total load at the bottom of the pier will be 600,000 plus 214,650 pounds, a total of 814,650 pounds. Assuming that the clay on which it will rest is good for 10,000 lbs. per square foot a bearing area will be required of 82 square feet. A circle 10 ft. 6 in. in diameter will give the required area so a chamber will be excavated at the bottom with this diameter, that is, to a radius extending three feet beyond the face of the shaft.

The depth of the footing is fixed by allowable punching shear on the circumference of the shaft, the value of which may be taken at 100 lbs. per sq. in. Dividing 815,000 by 16,900 (100 times inches of circumference) the depth at face of shaft is found to be 48 inches. The average diameter is 7 ft. 6 in., and a similar calculation, dividing 815,000 by 28,200 gives a required thickness at this point of 28 inches. To economize labor and excavate the chamber as quickly as possible it is given a bulbous form, care being exercised to secure nothing less than the computed depths. The projection is called a bell.

When a shaft passes through one or more seams of good clay it is not uncommon to form bells at such points in order to utilize the additional bearing area thus found. Provided they are all below possible future disturbance the total load will be divided by the number of bells, each of which is then designed to carry its share. This results in considerable economy in excavation. Theoretically the bearing power of the seams is not the same, owing to differences in depth but this is seldom given serious consideration if all are more than fifty feet below the surface.

Floor Live Loads in France

THE differences in allowable live loads for floors, noted in American building ordinances, find their counterpart in so small a country as France. The following recommended live loads are found in *"Constructions Civiles,"* by Barberet and *"La Construction Moderne—Pratique,"* by Guédy.

Mons. Barberet has the popularity in France enjoyed by Kidder in America and the loads recommended in his book are used more than those recommended by Mons. Guédy, who is a consulting architect and engineer for the city of Paris.

The loads are given in French in kilograms per square meter and are here translated into pounds per square foot for the convenience of our readers:

Building	Barberet	Guédy
	Lbs. per sq. ft.	
Residences	31	41
Dance Halls	83	103
Assembly Halls	83	123
Hay Lofts	84	93
Grain Warehouses	94	123
Salt Warehouses	125	164
General Merchandise	153	164
Paper Warehouses	206	308

Distribution of Forest Products

IN *The National Lumber Bulletin,* Mr. C. J. Hogue of the West Coast Forest Products Bureau presents the following opinion:

"The annual lumber consumption is about equally divided between industrial and structural uses.

"In the structural uses sash, doors, millwork, moulding manufacturers and planing mills consume about 25 per cent. of the total annual cut; boxing and crating about 15 per cent. and wood-using industries an equal amount.

"In structural uses about 20 per cent is required for structural timbers, of which about one-half is of the high-grade selected type, while in the other half the requirements are less rigid; railroad ties consume about 12½ per cent. and an equal amount goes into miscellaneous building uses.

"The railroads use about 20 per cent. of the annual lumber cut and farmers are said to use fully 50 per cent. About 60 to 80 per cent. of the annual production passes through the hands of wholesalers and about the same amount through retail yards."

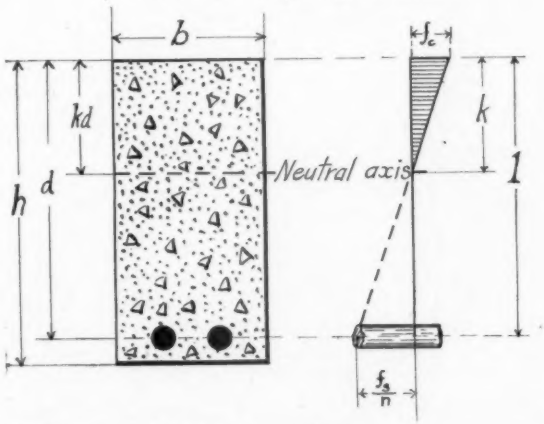
Wind Pressure on Chimneys

A JAPANESE professor, says *The Building News,* London, has been experimenting on the effect of strong winds on tall columns. In one case a chimney 550 ft. high in a wind of velocity 78 miles an hour oscillated at the top through 7¾ inches in the direction at right angles to the wind, and through less than an inch in the direction of the wind.

Reinforced Concrete Formulas

THE following collection of formulas to determine the position of the neutral axis and the steel ratio in beams of reinforced concrete is given in response to requests from readers:

f_s = unit tensile fibre stress in steel
f_c = unit compressive fibre stress in concrete
n = ratio of deformation between steel and concrete
m = ratio of stress between steel and concrete
p = ratio of steel area to concrete area
k = ratio of depth to neutral axis to depth to center of gravity of steel.



Ordinary straight-line formulas:

$$k = \sqrt{2pn + (pn)^2} - pn$$

$$p = \frac{1/2}{\frac{f_s}{f_c}\left(\frac{f_s}{nf_c} + 1\right)}$$

Formulas by Robert S. Beard in *The Engineering Record*, May 11, 1912:

$$k = \frac{nfc}{(f_s + nf_c)}$$

$$p = \left(\frac{f_c}{2f_s}\right) k$$

Formulas by Ernest McCullough in *Practical Structural Design:*

$$k = \frac{n}{n+m}$$

$$p = \frac{k}{2m}$$

The following formulas were evolved by G. F. Dodge in 1909:

$$k = \frac{1}{1 + \frac{f_s}{nf_c}}$$

$$p = \frac{f_c k}{2f_s}$$

All the foregoing formulas are based on the beam being balanced, i.e., the concrete resisting moment being equal to the steel resisting moment.

The following expressions are useful when the ratio of steel is known and a closely approximate value of the depth to the neutral axis is wanted in order to compute the concrete resisting moment. The method gives a value of k correct to two significant figures when the steel ratio is less than 0.01:

$n = 8$	$k = 0.15+18p$	
$n = 10$	$k = 0.18+18p$	
$n = 12$	$k = 0.20+18p$	
$n = 15$	$k = 0.23+18p$	(*Talbot*)
$n = 18$	$k = 0.25+18p$	
$n = 20$	$k = 0.26+18p$	

The economic stresses, that is the proper concrete stress economically to develop the assumed steel stress, or *vice versa*, may be closely approximated as follows:

$$f_c = \frac{f_s}{1.8n}$$

Floors and Floor Coverings

A NEW Farmers' Bulletin, Floors and Floor Coverings, gives practical information on various questions connected with the choice and care of materials for floors and their coverings, such as the best types of floors for various purposes, the proper finishes and good methods of cleaning. It was prepared by the office of Home Economics and is intended to help reduce the cost, the time, and the labor of keeping a house in order with regard to its floors. The bulletin may be had upon application to the Department of Agriculture, Washington, D. C., and should be in the library of every architect.

"Safety In Building Construction"

COPIES of the second edition of this book are now available for distribution and may be had upon application to the Home Office of The Travellers Insurance Company, Hartford, Connecticut. It contains 175 pages and 101 illustrations, as compared with 109 pages and 49 illustrations in the first edition. The subject matter has been re-arranged and expanded, and one entirely new section has been added.

Making Paint Hold

RECENT specifications for a good building showed that the specification writer was misinformed on the use of lead. Oil is essential and all coats should form one mass. Three thin coats containing considerable oil are better than two thick coats. Lack of sufficient oil causes lead to chalk.

Frame Houses of Pressed Steel or Metal Lumber

A Correction

IN an article entitled "Light Weight Structural Steel" in the issue of Sept. 28 it was stated that the first two-story house of this material was completed during 1921.

It appears that the statement was erroneous, proof having been given that similar houses were erected a number of years ago.

Telephones

CIRCULAR No. 112, Bureau of Standards, is a remarkably complete treatise on telephone service. It is well illustrated and written in non-technical language. It contains 214 pages and may be procured from the Supt. of Documents, Government Printing Office, Washington, D. C., at 65 cents per copy.

Safety Repairs on Elevators

THE Bureau of Buildings, of New York City, recently issued a general order requiring that in the future all worms and worm shafts on elevator equipment under its jurisdiction must be forged in one piece of sound steel or iron, free from welds. This action was taken because it transpired that some concerns had been welding new ends on worm shafts, when the key seats had become worn at the coupling ends of the shafts.

Coal Storage Data

THE following figures are stated to have been arrived at after thorough and carefully conducted tests, made for coal producers in New York, Pennsylvania and West Virginia:

Net Tons (2,000 lbs.) of the various sizes occupy cubic space as follows:

Broken coal	33	cubic feet
Egg coal	33.6	cubic feet
Stove coal	34.2	cubic feet
Nut coal	35	cubic feet
Bituminous coal	36	cubic feet

Gross Tons (2,240 lbs.) of the same sizes require:

Broken coal	37	cubic feet
Egg coal	37.6	cubic feet
Stove coal	38.2	cubic feet
Nut coal	39.2	cubic feet
Bituminous coal	40.2	cubic feet

The Peabody Coal Company, Chicago, Ill., as the result of careful weighing tests made the following data public in *Engineering and Contracting*, Nov. 10, 1920, for net tons:

Anthracite.	Pea	33	cubic feet
	Chestnut	34	cubic feet
	Range, Small Egg	35	cubic feet
	Large Egg	36	cubic feet
Pocahontas.	Slack	35	cubic feet
	Lump and Egg	35.5	cubic feet
	Mine Run and Nut	36	cubic feet
Quaker and New Era.	Lump	38	cubic feet
Quaker.	Egg and Nut	40	cubic feet
Acorn.	Lump	40	cubic feet
Wasco.	Lump	40	cubic feet
Screenings		40	cubic feet
Indiana.	Lump	41	cubic feet

Based on 40 cu. ft. per ton the following table of capacities is used for designing cylindrical coal pockets.

Depth of Coal Feet	Inside Diameter in Feet		
	12	16	20
	Capacity in Tons		
30	85	151	234
40	113	201	312
50	141	251	390
60	170	302	468

Bearing Pressures in Tons and Pounds

QUITE frequently, says *Construction Lime News*, building codes state that the safe load for walls shall be a certain number of tons per square foot. The following table gives the equivalent loading in pounds per square inch for the most commonly specified loadings:

Tons per square foot	Pounds per square inch	Tons per square foot	Pounds per square inch
18	250	8	111
15	208	7.2	100
12	166	7	97
11½	159	6	83
10.8	150	4	70
10	139	5	56

Removing Oil and Grease from Floors

ACCORDING to *National Safety News* a satisfactory method for cleaning greasy or oily floors is to use lime. Sprinkle air-slaked lime or hydrated lime over the floor in a layer about one-quarter inch thick. Leave it on for two or three hours, and then remove with a stiff brush. It will be found that the lime has absorbed the grease and oil, and the floor will present a surprisingly clean appearance. This has been used successfully on oily cement floors of machine shops which had resisted all other attempts to clean them.

THE AMERICAN SPECIFICATION INSTITUTE

127 North Dearborn Street, Chicago

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ANNUAL FALL CONFERENCE

THE Board of Governors of The American Specification Institute extends to all those interested in the improvement of specifications for building or engineering structures and their equipment, a cordial invitation to attend the first "Annual Fall Conference" to be held at the Chicago Engineers' Club, 314 Federal Street, Chicago, on the evening of Friday, December 9, at 6:30 o'clock.

The purpose of the Annual Fall Conference is to crystallize the thoughts of architects and engineers and to learn what those who have to furnish materials or perform work under specifications must contend with in their endeavor to provide what is wanted and still do their work to the best of their ability and for the economic benefit of themselves as well as the owner.

The program for the evening will include a banquet, following which there will be forceful talks on specifications by men representing the legal profession, the building material and equipment industries, the superintendent of construction, and the estimator, which talks will be followed by a discussion in order that all those present may have an opportunity to present their views, and it is hoped, to contribute further to the future activities of the Institute. Inasmuch as the Board of Governors desires a frank discussion of specifications so that we all may know how specifications may be improved, each speaker has been requested to present a critique of specifications without devoting time to fulsome praise in order to make a favorable impression. It is with a strong realization that specifications cannot be improved without constructive criticism that the Board of Governors has made this request of each speaker and it is believed that the evening's discussions will prove to be extremely valuable.

BULLETINS

THE following letters have been received in answer to Bulletins No. 1 and 2 and are given here as they present criticisms of interest:

Bulletin No. 1—Letter A

"Your circular letter of June 20, with a general specification outline, has been received and reviewed with much interest. I found, however, that in using the outline as given, it is rather difficult to find any particular trade involved without a great deal of hunting through the outline.

"In my ten years' experience in the building business, it seems that the construction business should be outlined under very general headings, and each heading then subdivided into detail subjects. There is attached herewith an outline which I have made up on this basis, and which I submit for your consideration. In addition to the development of an outline or checking list and the arrangements of specifications so as to conform with the sequence of construction, there should be a comprehensive outline of all work involved in building operation such as is indicated on the attached sheet.

"If the Institute is to fill the greatest need of those interested in specifications, the material must be so arranged that it is easily found as well as being usable. It will, therefore, be necessary to arrange, alphabetically, all items which are included in the specifications prepared by the Institute. These suggestions are respectfully submitted for your consideration.

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1. PRELIMINARY
   - Matters Preliminary to Contract
   - Preliminary Surveys, Sketches, Estimates
   - Inspection of Materials
   - Borings
   - Tests
2. CONTRACTS
   - Agreement
   - Contract Documents
3. SITE
   - Work preliminary to construction
   - Moving
   - Wrecking
   - Clearing
   - Sheeting
   - Protection of Trees
4. GENERAL
   - General conditions of The American Institute of Architects
   - Models

5. EXCAVATION
   - Excavation
   - Filling
   - Leveling
   - Pumping
   - Blasting
6. FOUNDATIONS
   - Soils
   - Piles
     - Wood
       - Plain
       - Creosoted
     - Concrete
       - Pre-cast
       - Cast in Place
7. MASONRY
   - Brick
   - Stone
   - Architectural Terra Cotta
   - Terra Cotta Floor Arches
   - Imitation Stone
   - Fireproofing
     - Tile
     - Concrete
     - Gypsum
     - Brick
8. CONCRETE
   - Structural
     - Mass
     - Reinforced
   - Finished Surface
     - Walls
     - Ceilings
     - Floors
   - Cast
     - Ornament
     - Blocks
9. CARPENTER WORK
   - Structural Framing
     - Walls
     - Roofs
     - Floors
   - Sheeting
     - Walls
     - Ceilings
     - Floors
   - Finish
     - Millwork
     - Cabinet work
   - Stripping
   - Furring
   - Grounds (wood)
   - Flooring
   - Siding
   - Ceiling
   - Forms
10. STEEL AND IRON (Structural)
    - Structural Steel
    - Cast Iron
    - Reinforcing Steel
11. BUILDER'S STEEL AND IRON
    - Sills
    - Guards
    - Anchors
    - Manholes
    - Gratings
    - Doors
    - Partitions
12. ORNAMENTAL IRON, ETC.
    - Ornamental Iron
      - Bronze
      - Brass
      - Copper
      - Cast Iron
      - Wrought Iron
      - Steel
    - Store Fronts
    - Elevator Enclosures
    - Stair Rails
    - Marquees
    - Fixtures
13. PLUMBING
    - Sewers
    - Drains
    - Plumbing
      - Rough
      - Finish
    - Gas
      - Coal
      - Acytelene
    - Water
      - Supply
      - Purification
      - Softening
      - Drinking
14. HEATING AND VENTILATION
    - Heating
      - Hot Air
      - Hot Water
      - Steam
        - High Pressure
        - Low Pressure
    - Ventilating
      - Fans
      - Ducts
15. ELECTRICAL
    - Light
      - Wiring
      - Fixtures
    - Heat
    - Power
    - Telephones
      - Outside
      - Inside
    - Call Systems
      - Fire
      - Express
      - Telegraph
      - General
    - Recording Systems
    - Signal Systems
    - Machinery and Equipment
16. POWER
    - Steam Power Plant and Equipment
    - Electric Power Plant
    - Water Power Plant
17. WATERPROOFING
    - Asphalt
    - Tars
    - Paints
    - Membrane
    - Integral
    - Papers
    - Fabric
18. INSULATION
    - Materials
      - Cork
      - Mineral Wool
      - Quilts
    - Cold Storage
    - Heat
19. ROOFING
    - Slate
    - Tile
      - Clay
      - Cement
    - Composition
    - Shingle
      - Wood
      - Metal
      - Cement
      - Asphalt
      - Asbestos
    - Metal
      - Tin
      - Copper
      - Lead
      - Corrugated Iron
    - Glass
20. SHEET METAL WORK
    - Materials
      - Copper
      - Lead
      - Tin
    - Flashings
    - Skylights
    - Cornices
    - Ceilings
    - Ventilators
21. METAL DOORS, WINDOWS, TRIM
    - Solid Steel Sash
    - Hollow Metal Trim
    - Kalamein Trim
    - Doors
      - Tin Clad
      - Kalamein
      - Hollow
22. MARBLE, MOSAIC, ETC.
    - Marble
    - Mosaic
    - Tile
      - Clay
      - Cement
      - Cohesive
      - Faience
    - Terrazzo
23. HARDWARE
    - Rough
    - Finish
24. LATH AND PLASTER
    - Furring, Metal
    - Lath
      - Wood
      - Metal
    - Plaster
      - Plain
      - Ornamental
      - Scagliola
    - Exterior Plaster
25. GLAZING
    - Glass
      - Plate
      - Sheet
      - Art
      - Mirrors
    - Glazing
    - Structural Glass
26. PAINTING AND DECORATION
    - Exterior Finishing
      - Paint
      - Varnish
    - Interior Finishing
      - Painting
      - Staining
      - Varnishing
      - Oiling
      - Calcimining
      - Cold Water paint
      - Paper Hanging
      - Fresco
      - Mural Paintings
27. FURNISHINGS
    - Draperies
    - Window Shades
    - Furniture
    - Fixtures
    - Sculpture
    - Paintings
28. CLEANING
    - Exterior
    - Interior
    - Windows
    - Premises
29. EQUIPMENT
    - Mail Chutes
    - Clocks
      - Master
      - Secondary
    - Sash Operating
    - Vault Doors
    - Sidewalk Lights
    - Window Cleaner's Outfit
    - Weather Strips

30. MECHANICAL INSTALLATIONS
- Elevators
- Elevator Signals
- Dumb Waiters
- Escalators
- Pneumatic Tubes
- Conveyors
- Pumps
- Ejectors
- Refrigeration
- Vacuum Cleaners
- Compressors
- Cash Tube Systems

31. FINISH FLOORS
- Wood
- Cork Tile
- Composition
- Mosaic
- Marble
- Ferrazzo
- Tile
  - Rubber
  - Cement
  - Clay

32. MISCELLANEOUS
- Accoustics
- Window Screens
- Smoke Stacks
- Landscape
- Sculpture
- Roads
- Pavements

33. ADJOINING PROPERTY
- Sheeting
  - Wood
  - Steel
- Shoring
- Underpinning
- Needling

LETTER B

WE believe that Bulletin No. 1 deals with the general subject that the first Bulletin issued by the Institute should deal with and that a carefully worked out standardization of specification subject headings will be of great benefit to specification writers.

"As a foundation skeleton we favor the use of main divisions by trades with subheadings under each trade rather than a continuous list of subjects such as the Bulletin gives. Take, for example, item 28, 'Furring' might be wood, or hollow tile, or skeleton iron, and would better be a subheading under carpentry, fire proofing, and lathing and plastering to be dealt with under whichever trade the particular case called for. The same scheme would place item 30 as a subheading under all trades where modeling is apt to be required. The same principle would also apply to many other of the 92 items given in the Bulletin. We enclose a rough draft only partly filled in, showing the idea. There is nothing particularly novel about this, the scheme having already been used more or less. We have found it practical and applicable to a wide range of work and adjustable to either a simple or an extensive specification.

"The page numbering of specifications will also bear some consideration. The ordinary method of numbering the pages in a straight sequence from the first to the last makes it necessary to complete the specifications before the page numbering can be established and any later alterations are apt to upset the numbering and make new numbering necessary. A method which overcomes many of the difficulties consists in using an index letter for each trade subdivision and numbering the pages of every separate trade with an independent series beginning at No. 1 in each case. That is, the first section, whatever it is, say 'General Conditions,' will run A1, A2, A3, A4, etc. The next section, say 'Preliminary Work,' will run B1, B2, B3, etc. The next section, say 'Excavation' will run C1, C2, C3, etc. By this system any trade can be written at any time independently of the other trades so far as paging is concerned. This is sometimes found desirable as when separate trade proposals are being asked for. Then too, when amendments are made in the specifications, requiring alterations, the paging of the particular section only that is affected would be altered."

BULLETIN NO. 2—LETTER C

I PRESUME that practically everybody who writes specifications has prepared some sort of an outline for the more ready forwarding of the work, and that these outlines are used in various forms.

"In the office of————we use a master specification, which has been developed through the years, and which is always in a state of reconstruction as conditions develop. This master specification was formerly a card index, as mentioned in your late bulletin, but we have found it more desirable to condense it and place it in a loose leaf system in a book, any of the pages of which can be readily removed, retyped and replaced. I find this procedure is helpful in eliminating old stuff and material rarely used. We do not attempt to use the master specification verbatim, except in small part, but write or dictate, a new specification for every job.

"The practice of writing a specification by trying to adapt an old one is, in my opinion, bad practice, as it is inevitable that references creep in which are not applicable to the contemplated work, and items are forgotten which are important to include.

"We find that the constant reference to the master specification as a checking list is a much more satisfactory procedure as tending to produce a complete specification."

LETTER D

AND now a word or two concerning these specifications and my method of preparing the same. I have for years written all my specifications on what might be called a loose card paragraph system; that is, I have a 5 x 8 filing system, each card in this system containing a separate clause in the specification, and of course each trade occupies a separate place in the filing system.

"This system as now developed contains every clause that I have ever written into any specification since the founding of this system some ten years ago and in writing any trade it therefore be-

comes necessary to review every clause I have previously written into this trade, making it practically impossible to overlook any situation which has ever occurred before. Of course it is the extraordinary situation occurring on a particular job which is always fresh in the mind and which is therefore difficult to overlook in the writing of specifications for this work.

"In writing the specification for any trade, I simply read every card under that trade and remove such cards as are pertinent to the specification in hand keeping them, of course, in their original order. These cards are then snapped together with a rubber band and turned over to the stenographers to write the trade. After the proofreading, which is done from the cards, they are returned to me and are placed back in the trades in their original positions, leaving the trade ready for the writing of the next specification.

"The cards in each trade are arranged as follows: First, general clauses; second, description of materials; third, then follows the actual steps performed in that trade as nearly in the order of their performance as is feasible.

"If you will read the trade 'Reinforced Concrete' in the specification sent you, I think you will appreciate this arrangement of clauses in each trade.

"Insofar as possible the clauses in each trade have been prepared to cover as general a condition as possible, but of course some slight additions have to be made to the cards, which are done in blanks left for this purpose on the cards, in pencil or by checking the different items listed in the cards in pencil, which pencil marks are, of course, erased upon the writing of the next specification if not pertinent.

"I have found this an excellent and very simple method of preparing a specification and I believe it is as quick a method as there is. The specification which I am sending you was completed in about eight hours working time.

"My painting specifications I write in a somewhat different manner from the ordinary, this idea having been worked out by me with two objects in view:

1. To make it visibly apparent just what processes are to be employed in each different part of the work; and
2. To make it possible for the superintendent of construction readily to check the work as it progresses.

"I do not know of anyone else who uses this method of writing painting specifications, with the exception of those architects to whom I have shown it and who have adopted it as their standard.

"If you are interested, I suggest that you read the painting trade in the enclosed specification.

"I should be glad to answer any questions which you may have concerning my method and the results obtained thereby and I am looking forward to the receipt of the questionnaire which should reach me shortly."

Letter E

YOUR letter of recent date containing suggestions from members with respect to card indexes for specification writing has been duly received. The writer has carefully read the letters 'A' and 'B' and is of the opinion that a card index system of some sort is the only logical method for the specification writer to use in dictating specifications for the various kinds of work.

"Like the writer of letter 'A', we have in the office under way a specification form developed from our past experience in writing specifications. The undersigned of this letter has had quite a bit of experience estimating in the office of a large contracting concern, as well as twenty-five years of drafting, and has spent a great deal of time in the last twelve years perfecting his specification for use in this office.

"While, in my opinion the general form of card indexing is the best method, I cannot but feel that unless the architect or specification writer understands the terms thoroughly, it is of no use to him. The mere fact of copying what some one else has written would be apt to develop complications. In following a card system, the specification writer must thoroughly understand materials and *workmanship* which is the real essence of a specification and which comes from long training and experience in observing and handling work. A knowledge of materials is obtained from the actual experience one has had in using them and a good catalog system where the specification writer may easily find the names, quality and kind of material he needs for a particular purpose as it is a well known fact in specification writing that one kind of material used in one job will be of no use in another.

"I feel that the form of specification which I am writing, while it is very simple in its construction and plain in its language, would necessitate an understanding of its terms, if one were to use it properly. I am not condemning such a form, for as I mentioned above, I think it a practical solution of the problem, *if* the user understands the terms, and is familiar with the name and the kind of material specified, and the proper workmanship required for the particular purpose.

"Referring to the catalog system, our office has spent considerable time and money in developing a catalog system which proves useful to us in specifying a material by its trade name, and thus eliminating the clause, 'a certain kind of goods or equal thereto' which is employed by so many architects."

Letter F

WITH reference to Bulletin No. 2, Serial No. P.2, Letter 'A':

"A text book on the writing of specifications will be most welcome. I have been planning such a book

myself but pressure of other work has prevented me from getting much beyond the planning. I will welcome the new book if published and will be glad to lay aside my plans as I have other work I want to undertake.

"Personally I am in favor of a looseleaf system rather than a card system, having tried both to some extent. I could use a good text book with my classes to advantage, and I believe there are many architects operating small or modest offices who could use such an aid to specification writing to great advantage. Letter 'B'.

"The statement that I favor a looseleaf system applies to this also. Bulletin No. 3, Serial No. 10.

1. Matters Preliminary to Contract:

"Survey should show, or Investigations should determine: Location of sewer, storm sewer if any, gas main, electric light (and power) lines and telephone lines, for nearest connections. Many surveys show grades only. They should show trees and shrubbery, whether to be removed or preserved.

2. Agreement and Schedules of Conditions of Contract:

"The American Institute of Architects General Conditions are excellent, but voluminous for the smaller work. I believe it to be as impossible for one set of general conditions to be made to apply to all classes of work, from the $5,000 house to the $500,000 or several million dollar office building as it would be to write a text book on any subject that would be of equal interest to the beginner and the expert.

"I believe it to be important to have these general conditions modified to apply suitable to the smaller work. The matter of education in specification writing can best be approached from the bottom up, rather than from the top further up. It is not, to my mind, so important to aid the experienced specification writer to make his work more nearly perfect as it is to aid the average architect to improve his product, which is at present often very unsatisfactory.

"If the writer of letter 'A' should give any idea as to how soon he may be able to publish his text book it will help not only those teaching the subject but many practicing architects to decide whether or not to keep on with efforts to standardize their specifications. I should like to see the book produced in the same way in which the Handbook of Architectural Practice was produced by The American Institute of Architects. You may be familiar with the fact that Mr. Frank Miles Day put the matter into the hands of the Institute for publication. It was first printed in unbound form and submitted to a number of the members for comment before final publication. It would be a real 'boost' for The American Specification Institute to publish the book, and the author could still profit from a royalty on sales if desired."

Letter G

THE bulletin, No. 2, Serial No. 0.2, was received and the enclosed letters were very interesting. The subject of proper filing of data to make it available when needed is a problem and one not to be easily solved.

"I do not find the card system with master paragraphs to be a satisfactory one for continuous use. The same holds good for the re-use of specifications drawn up for buildings previously erected which are of a similar character. The chief fault that I have found in such a system is that the work is estimated and carried out on the basis of the custom of the office, reflected in the specifications. I know this to be true. It is especially true when certain contracting firms continue to carry out the work of certain offices which is often the case.

"It was following one experience in my own work, where the use of the 'master paragraph' specification of that office brought extras into the work owing to the fact that the work was proven to have been estimated on the basis of the usual custom and not on the actual specification, that I revised my work so that the specification was a real description of the work to be done on that particular building.

"It was proven in my later work that I could give the information necessary to tie in with the drawings by making them a description of the building and together they made a complete picture of the work to be erected.

"Specification data should be filed and used and the card index arranged to show where to find that data quickly, and also indicating the catalogs of the firms supplying, as well as the materials best suited to the proposed work, gives the most satisfactory results. I do not believe the most thorough and complete specification can be written by handing numbered cards to a stenographer. The plan creates the thoughtless way of approving the data because the title looks right. It takes but a little more time to draw up a rough draft in a manner that requires the grouping of the paragraphs in proper sequence which, when read as a whole, shows that proper thought was behind it and that the pages mean something more than so many pages."

Letter H

ALMOST everybody immediately interested in specification writing realizes some sort of a card system must be used as a skeleton. To produce such a system for building work in general would be a great achievement of The American Specification Institute, incorporating the experience of its several members, and later revising the cards.

"Having had considerable experience in this

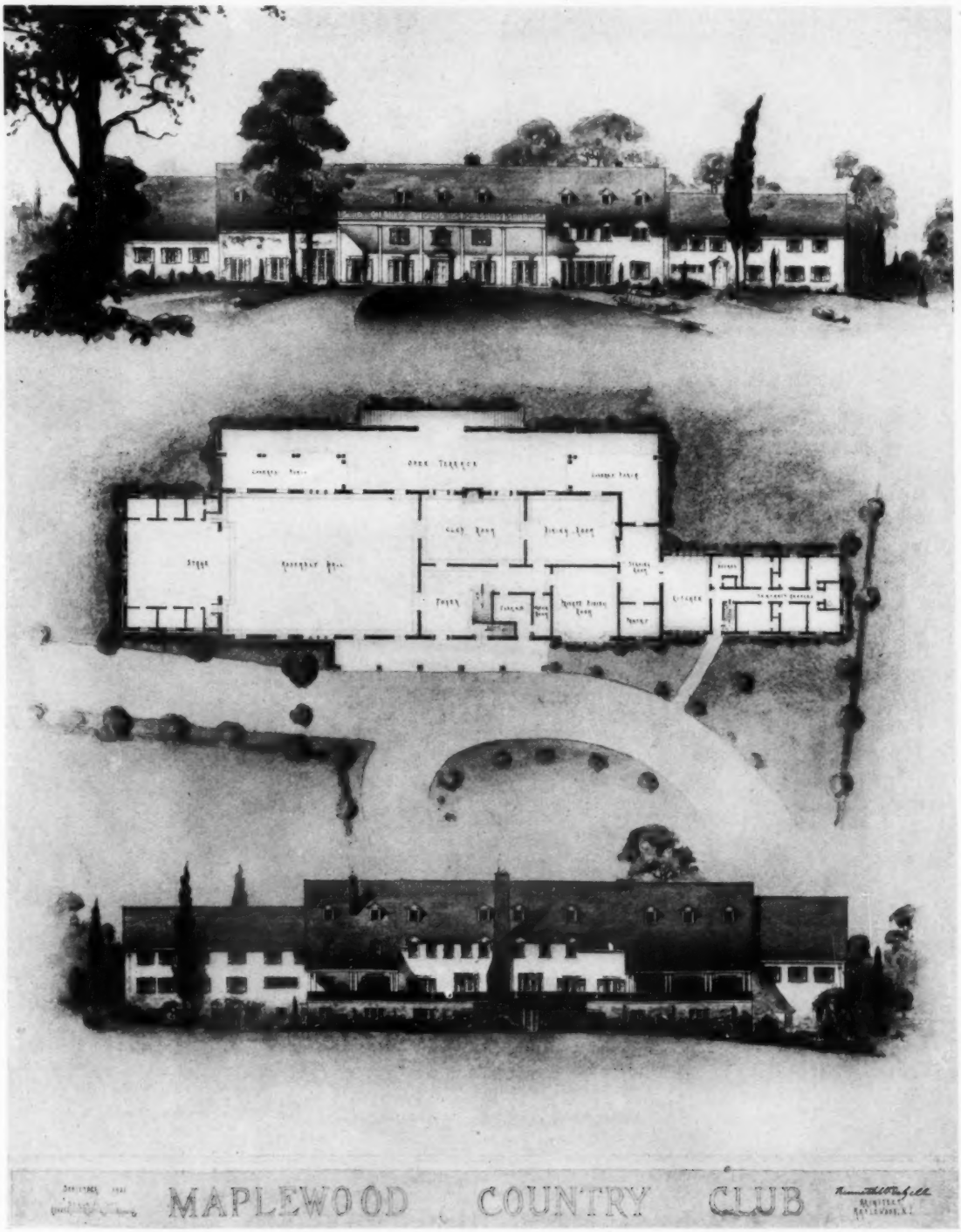
field, I wish, however, to carry this card system further by giving clear, short, impartial and competent advice to the specification writer as to how and when to use each card. This has been done in this office under 'remarks' immediately after the card heading, resulting in suitable choice of materials for different kinds of work and proper technical instructions for use of different materials. By such a method the rigidity of stock specifications may be eliminated. Attention must also be paid to different grade of workmanship desired by clearly specifying what is wanted.

"With such data it will probably be found that card size is too small,—in this office we use the regular letter size, frequently filled up by any item and its 'remarks,' often with vacant space for future addition of new data. Typed on thin paper a selection of required pages (or items) is made from their index under any kind of contract work or trade and the blueprint copies used as stubs for the specification writer. It produces a complete, technically correct specification of suitable materials fitted to the kind or class of work for which it is intended.

"I should like to see The American Specification Institute undertake such a work for the building industry. Its extension into the fields of engineers and purchasing agents of materials can easily be done. Before it is started the standard form of type should be determined as well as a general classification of subjects.

"In the very nature of the case it is impossible for your Institute to make any research work about all of this material—and your technical data must be furnished from societies directly interested—by your representation on their committees or sharing their heavy expenses."

Architecture as a harbinger of good will—The "Piaphong," erected by the Chinese at Chefoo, and dedicated to the people of the United States



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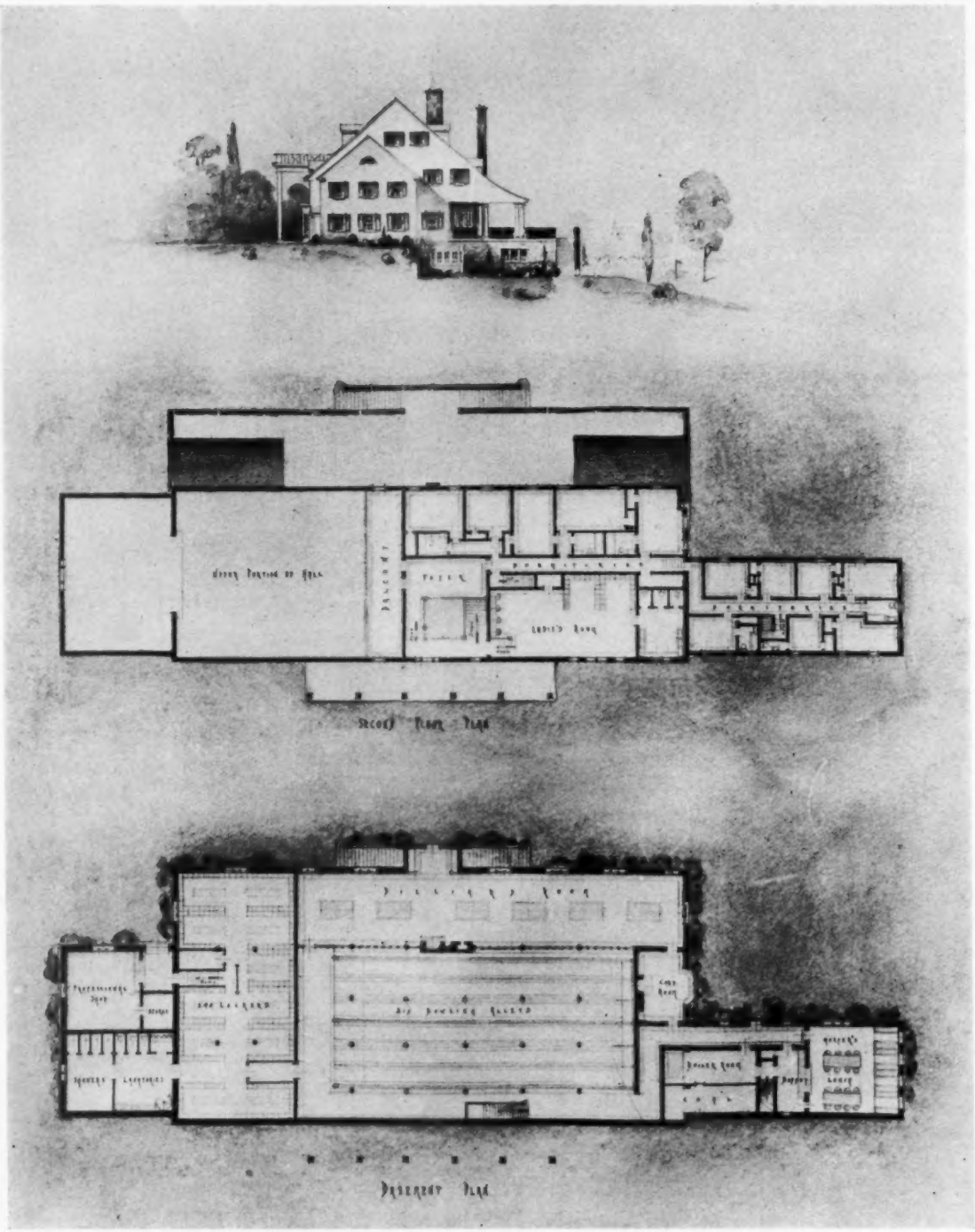
KENNETH W. DALZELL, ARCHITECT



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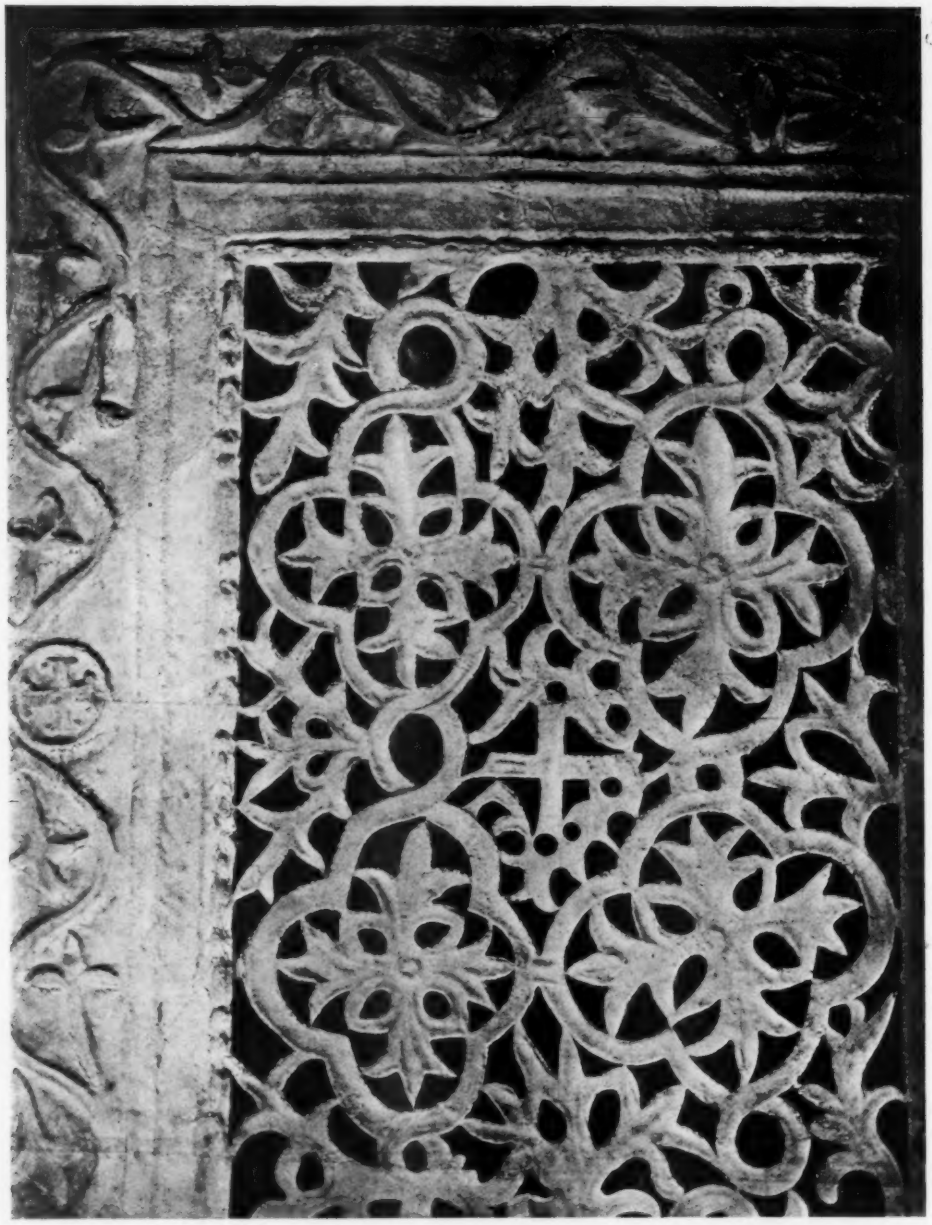

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